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What Manchester Thinks Today

THIS week, the Manchester District Council of the National Union of Railwaymen, which represents about 23,000 railwaymen, challenged the authority of the National Executive Council of the union. It announced that, while withholding its support to a one-day token strike on February 1, as a protest against the Commission's delay in settling the union's pay claims, it might call for strike action within its area unless a satisfactory pay offer was soon made. Although representing only one division of the N.U.R., the Manchester council's announcement must arouse anxiety in both Commission and public. Last week, Sir Brian Robertson, Chairman of the Commission, stated that the Commission was entitled to expect that the National Executives of the trade unions would be supported by their members; sound industrial relations were not possible on any other basis. Subsequently, Mr. S. F. Greene, General Secretary of the N.U.R., wrote in *The Railway Review*: "With public opinion on our side, it is tremendously important to the final settlement that we should not unnecessarily throw away that good will . . . to achieve what we want, it is more than ever necessary that we should act as a united, disciplined body, and give solid backing to the Executive Committee." Throughout the year, we have drawn editorial attention to the mischief that can be caused through non-attendance by the mass of union membership at its branch meetings. It now appears that mischief has been brewing, and that it might result in an irreparable schism throughout the union. Even if matters do not come to so serious a head, there is no doubt that the dissenters have already done themselves and their union incalculable harm. Disloyalty is particularly disliked by the British as a nation; blackmail is held in odium the world over. Perhaps the National Executive Council of the N.U.R., and Mr. Sidney Hoskins, who resigned as Secretary of the London District Council rather than head his membership in the threatened strike, will forgive the sabotage: the Commission and the public will not so easily forget the highway-man tactics. In this instance, one may hope that, what Manchester thinks today, the rest of the world will not think tomorrow.

Repercussion

ON Tuesday, January 19, Mr. Greene wrote to Sir Brian Robertson, asking for an early meeting to discuss an immediate interim increase in salaries and wages for railwaymen. He had already telephoned to Sir John Benstead, Deputy Chairman of the Commission. Mr. Greene's letter was written after a special meeting of the National Executive Council of the N.U.R. had been held that day, at which the union's wage claim had been considered and the threats of London and Manchester railwaymen had been discussed. Mr. Greene and the N.E.C. feel that the only way to improve a steadily-worsening position is to obtain a rise in rates of pay, and that as the Commission has given a widespread impression that it is already committed to a retrospective increase later in the year, it might as well concede it now. Mr. Greene commented: "Everyone is assuming that the pay review will give us something. We shall get a hell of a shock if it does not, and there will be a hell of a row if it does not." He also stated that, if the Commission made a reasonable interim settlement, his committee would consider not sending its other application for a wage increase forward to the tribunal. The question of retrospection could be discussed later. He hoped that the new approach to the Commission would cause those railwaymen who have threatened to strike to think again. "I think we have a great fund of good will from the general public," he said. "But it is an odd way of repaying it to say: 'Thanks very much, but on Monday we are going to make you walk to work.'" An even odder addition would be: "The alternative is to make you pay more than the rates and fares you already consider too high."

Other Headaches

ON January 13, all three railway unions—N.U.R., A.S.L.E.F., and T.S.S.A.—made claims for a shorter working week. The N.U.R. and A.S.L.E.F. are seeking a reduction from 44 to 40 hours. T.S.S.A., whose members now work a 42-hr. week, want a 38-hr. week. As a shorter working week generally means a longer wages bill, and as the Commission has already established its unwillingness to discuss pay claims until it has received the Guillebaud report, no prizes are offered for guessing the answer to the new demands. These were not unexpected in themselves but in their timing: it had been assumed they would not be made until the pay question had been settled. Their early submission may represent the desire of the union heads to demonstrate the vigour of their conduct; they can also be used as a stick to persuade militants against ill-advised action. More worry for the administration of British transport is represented by the application by London busmen for a £1 increase and for additional payment for drivers and conductors doing shift work. This claim has been refused.

Good Prospects for the N.E. Region

RESURGENCE of the iron and steel industries in North Eastern England as a source of more mineral traffic is welcomed by Mr. H. A. Short, General Manager, British

Railways, North Eastern Region, in a new year message in the current issue of the Regional edition of *British Railways Magazine*. But wagon stock, he points out, has not been made to move quickly enough in the Region to meet rising traffic demands; and passenger train punctuality, though much better, still leaves much to be desired. In both these fields every possible effort must be made. It would be a pity if the goodwill created by the new diesel services were dissipated by late running of these and other passenger trains. Mr. Short mentions the impending completion of the programme of introducing multiple-unit diesel trains as one of the measures on which progress will continue in the current year. New diesel-electric locomotives, he adds, are being placed in service, work is proceeding on marshalling yards, new signal-boxes at Newcastle and Huddersfield will be followed by others, and improvements are being carried out on motive power depots and on the telecommunications system. These and other improvements, to which reference was made in our January 1 issue, will help to provide better services and thereby to attract more traffic, and to effect economies. The staff of the Region can look forward to a year of progress provided that they themselves play their proper part.

Coal Output to be Cut

ACCOUNT already has been taken by the British Transport Commission of the probable effect on British Railways traffic of the reduction in coal production planned by the National Coal Board this year. Although total consumption may rise, the Board's stocks amount to 36,000,000 tons. Forty-six collieries are to be closed, and with lower output elsewhere total production may be only some 195,000,000 tons, against 206,000,000 last year. In planning movement of coal, the situation is complicated by the existence of the stocks, which are being reduced. Results for 1959 are likely to show total carryings by British Railways of 143,000,000 tons of coal, against 153,000,000 in the previous year. Electrification and introduction of diesel traction are reducing the amount of coal used by British Railways. In 1949, 13,900,000 tons were consumed, in 1957 11,600,000, and in 1958 10,700,000 tons. The reduction is in the demands by the Western Region for briquettes and ovoids is reported to be seriously affecting manufacturers of patent fuel in South Wales.

Higher Charges on C.I.E.

UNDER the terms of the Transport Act, 1958, an obligation was placed on Coras Iompair Eireann to pay its way by March, 1964. In its report for the year ended March 31, 1959, C.I.E. recorded a loss of £1,798,000. In the circumstances, when wages increases to the extent of £700,000 were recently granted to the employees, it became inevitable that bus and railway fares and freights would be raised again. Last Monday all 6d. and some 4d. and 5d. bus fares were increased by 1d. in Dublin, Cork, Limerick and Waterford. On February 1, existing rail fares will be increased by 7½ per cent. This will produce a fare factor of 2·8d. per mile second class. Rates for freight traffic by rail and road will be increased by approximately 10 per cent, and small parcels deemed uneconomical for handling will be increased by 16⅔ per cent. There will be a 7½ per cent increase in provincial bus fares. It is estimated that the additional revenue will fall somewhat short of the amount required to meet the higher pay, but it is hoped that the balance will be found by introducing greater economies in operation, and by accelerating the drive for efficiency.

The Suburban Traffic Problem

THE teething troubles on the first day of operation, last week, of the St. Pancras-Bedford diesel service of the London Midland Region, were given, like other mishaps on British Railways, a good deal of space in the newspapers. The *Evening News* made them the occasion for some constructive comment. On any other railway system, it was pointed out, a breakdown caused disruption; but on the suburban lines into London at the peak hour "it means chaos." That may be an exaggeration, but the journal was right in stressing the gravity of the problem of peak-hour suburban traffic, and in drawing attention to the views of Mr. P. A. White, Line Traffic Manager, South Eastern Division, Southern Region. These were expressed in his paper, to which we referred last week, to the Institute of Transport. His demand for a "design for living" in London, the *Evening News* suggests, deserves consideration. Staggering working hours could ease congestion, but not for long. Local authorities must decide whether much more residential accommodation should not be built in Central London, and firms must weigh the advantages of offices involving daily travel from and to the suburbs, pending revolutionary changes in public transport facilities at present beyond the powers of the undertakings concerned.

"The Apparel Oft Proclaims the Man"

UNIFORMS of British Railways staff include nothing as ornate as those of London & North Western passenger guards, for instance, and other grades 50 years ago. They can, however, look smart when well cared for and properly worn, and are well designed for working at the appropriate job. Bad turn-out of a porter, say, unloading parcels from a van, can create an unfortunate impression with railway users, apart from the effect on the self-respect of the wearer. This is stressed in a recent issue of the London Midland Region edition of *British Railways Magazine*. Two photographs are published. One is of a slovenly individual in a badly creased porter's uniform with much else wrong in his dress; such sights, unfortunately, are not very rare. The other illustration shows how smart, but practical, a porter's uniform can look. "He is the sort" it is stated "who builds up the prestige of British Railways more than he knows. By his businesslike appearance and helpful manner he makes our customers our friends and commands the respect of his superior officers . . . and brings the public we serve to like and respect railwaymen as a whole." With mechanisation in railway work there are fewer dirty jobs, and increasingly greater opportunities of looking smart and workmanlike.

Paris Metro to Connect with S.N.C.F.

EXCEPT for the Sceaux line, a mainly surface suburban line which was formerly part of the Paris-Orleans Railway, the electrified system worked by the Régie Autonome des Transports Parisiens (Paris Transport Authority), the Metropolitan, consists of sections mostly in tunnel a short distance below street level and without branches. Trains stop at all stations. The R.A.T.P. now plans to build a new line for fast trains beneath the existing west-to-east Métro line from Neuilly to Vincennes. It is to link up at each end with the French National Railways. Part of the S.N.C.F. line from Paris Bastille to Vincennes will be electrified, and Métro trains from and to the deep-level line will run over that section. The new Métro line will include interchange stations with the present west-to-east line. Construction of other, presumably deep-level, sections of the Métro, affording fast running between the centre of Paris and the suburbs, is under consideration. The Métro was originally designed to be entirely independent of the main-line railways, and the assumption of working of the Sceaux line, in 1938, when the main-line railways were nationalised, represented a change of policy.

More and Better Holidays Abroad

THE current year may prove to be the most outstanding for holiday travel since 1939. For the first time in over 20 years currency restrictions for residents in the United Kingdom have been virtually removed. This has increased the opportunities of travel to U.S.S.R. and countries outside Europe, including North and South America and Mexico. Examples of what can be achieved by skilful planning and organisation by travel agents to increase the pleasure and reduce the cost of travel in many lands are shown in "Holidaymaking, 1960," the programme of Thos. Cook & Son Ltd. and Dean & Dawson Limited, the subject of brief notice elsewhere in this issue. There is evidence also of the stronger economic position of Britain in demands for comparatively expensive holidays. This was experienced last year by Thos. Cook & Son Ltd. as regards holidays in the Naples area. As a result that agency has specially featured such resorts for the coming holiday season. The increasing willingness to spend more, whether in

travelling farther afield or in greater luxury, is a new factor faced by travel agents who have been doing everything possible to reduce costs. The railways and railway-owned and associated steamer services will benefit, but every effort must be made to improve services and keep fares down, for competition from air and road is becoming formidable. Much can be done to improve the comfort and convenience of rail and steamer travel, notably in curtailing customs and immigration formalities at ports and frontiers. The speed of railway travel could be further emphasised in publicity.

Road and Rail Track Costs

MUCH has been said of the desirability of ensuring a rational use of railway and road facilities by charging for use of the "tracks" in both forms of transport. Advances have been made in the science of costing movement by rail, but little is known about ways of assessing and collecting proper charges for use of roads. The difficulties are outlined by Mr. D. L. Munby, Reader in the Economics & Organisation of Transport in the University of Oxford, in his paper last week to the Southern Section of the Institute of Transport, at Southampton. He enumerates the factors to be considered in new, under-utilised, and congested roads, and in city streets. More could be found out, he believes, about the actual use of the roads, and, by careful use of tolls, how much people are ready to pay for them. There could be differential license charges, he suggests, for use of motorcars in country and town, and perhaps even special peak-period charges for those who travel to and from work in the rush-hours. His suggestions seem to overstep the bounds of possibility, at least as regards public opinion in its present state. But until track costs are allocated, the railways, which pay for the whole of the provision and maintenance of their own tracks, unlike carriers by road, will continue to bear an inequitable burden.

Southern Region Publicity

THE publicity side of the Southern Region's Public Relations & Publicity Department is to be congratulated on receiving public acknowledgment of its ability. For the first time in its history, it has entered open advertising contests, with some considerable success. Its Canterbury poster, which portrays St. Thomas à Becket after the style of a stained-glass window, has won a First Prize at the Lisbon Trade Fair. Two other posters, for Hastings and the Car Ferry Service respectively, have earned Second Class Awards in the National Outdoor Advertising contest held by the *World's Press News*. All these posters are reproduced in our news pages this week, together with another new production advertising road-rail traffic. Latest publicity material continues to maintain these high standards: posters include a clearly-designed and lively incentive to passenger rail travel, suggestions for Continental and Winter Sports holidays, and a new design involving a dramatic use of colour to advertise the Night Ferry Service. Also new, and described in detail elsewhere in this issue, is a most attractive booklet covering the Continent and Scandinavia.

Cold Trains

AT this season the complaint is heard constantly that the trains are cold, but this is largely the fault of the public. A little observation will show that hardly anyone thinks of closing a corridor door window after opening it to reach the handle, or of closing a compartment door leading into the corridor. On a bitter day recently, with a strong wind blowing, we noticed a train at a terminus in which practically every corridor door window had been left open on both sides, for at the last station the platform had been on the opposite side. The train was cold almost throughout. When a passenger complained to us about this we indicated the reason to him: the carelessness of his fellow passengers. It might be possible to counter this by affixing notices alongside the windows and instituting some propaganda by posters and so on, showing that one cannot expect trains to be warm under such conditions. This thoughtlessness has the further consequence of making trains dirty, another source of complaint, if they have to traverse tunnels. Corridors become filled with smoke and smuts, as do the compartments if the last passenger to leave one neglects to close its door.

Problems for Parliament

WITH the re-assembly of Parliament next week several transport problems call for urgent consideration. The Minister of Transport, Mr. Ernest Marples, recently returned from his instructional journeys to the Continent and the U.S.A., will have his work cut out to satisfy the increasing concern of Members on both sides of the House with the problems of roads and traffic and the ever-growing toll from road accidents, and the continuing financial difficulties of British Railways. Since he assumed office he has been much occupied with the growing traffic congestion in cities, which he has shown commendable determination to tackle at the risk of incurring unpopularity by imposing restrictive measures on some classes of road users, and enforcing them. This preoccupation of the Minister is understandable, for the inconvenience of traffic congestion affects pretty well the whole community. The roads do not, however, deserve any higher priority than do the railways; nor are their problems of greater urgency. Neither form of transport should be dealt with in isolation.

Certainly within the next few months Mr. Marples will have to make important decisions on the financial situation of the British Transport Commission. Since the re-assessment, last year, of the modernisation plan and of the Commission's financial prospects, little has occurred to improve the position. Towards the end of 1959 some improvement in traffic was discernible, but the year is bound to show a substantial deficit again. Although the Chairman of the Commission, Sir Brian Robertson, has stated that the deficit will be less than for 1958, it is certain to draw further on the permissible borrowings for deficits to such an extent that the total of £400 million available is almost certain to be fully absorbed next year. Whether the threatened token railway strike materialises or not, the Commission is likely to be faced with an increased wages bill dating back to this month.

As a result of the re-assessment the Commission concluded that some relief of its mounting financial burden, particularly interest charges, would be required. No specific recommendation was made; nor did the then Minister of Transport, Mr. Harold Watkinson, indicate what the Government policy was in this regard. Action is urgently needed, because as long as the present uncertainty continues, the more difficult it becomes for the railways to regain their reputation with the public and for the morale of those responsible for operating them to be maintained at the highest level.

A decision on the future of the Commission and its finances should be reached in the light both of the role which the railways are to play and of the situation on the roads. So long as deficits accumulate and are met by borrowings, the true competitive position of the railways is hard to determine. If British Railways is to carry those goods which it is most economic for it to carry, there must be no element of subsidy in assessment of costs and charges. That cannot be the case as long as the present financial position remains unresolved. The railways have an essential and continuing function and with increasing congestion on the roads and the growing number of road accidents it is in the national interest that as great an amount of goods be moved by rail as can be economically justified. It is equally important that the continuing investment of public funds under the railway modernisation programme be properly employed. Parliament as the watchdog for the nation no doubt will wish to be reassured that this heavy investment is fully justified and that it will result not only in increased carryings but will also bring some relief to the roads, with which, for the present, Members seem more concerned.

Meanwhile there is pressure on all sides, much of it skilfully organised, for increased expenditure on roads and for drastic action to relieve traffic congestion. Both are essential but an improved road network, which attracts and generates traffic, is in itself no answer to the long-term transport problem. The large sums of public money now being invested in both roads and railways must be used as economically as possible and result in competitive transport costs. It is to be hoped that both the Minister of Transport and Members of Parliament will not allow immediate pressing problems of roads and traffic so to absorb their attention, and so overload the Ministry, that the working out of a longer-term transport policy is further delayed. The first requisite is that the financial structure

of the Commission be placed on a permanent basis so that the nationalised transport industry knows where it stands, and the railway managements know the function they have to fulfil and the targets that have to be aimed at for the Commission ultimately to achieve financial equilibrium. That may entail a financial reconstruction, but it is the responsibility of Minister and Parliament to take the plunge as soon as the necessary decisions, however unpalatable, can be made.

Canadian National Railways in 1959

THE year 1959 has been, for Canadian National, a period of intensive drive on all fronts to win its fair share of an increasingly competitive transportation market. This is stated by Mr. Donald Gordon, Chairman & President, Canadian National Railways, in his year-end review of 1959.

Precedent-breaking innovations in passenger service and a host of improvements in operational facilities ranging from the increased use of diesel traction to signalling and radio communications systems, new shops, and simplified procedures were an indication of the C.N.R.'s determination to achieve maximum efficiency in giving customers what they want at prices they are willing to pay.

The facilities customers heard about most and used were all-inclusive passenger fares, reduced rates for group travel, instalment plan travel, C.N.R.-T.C.A. credit card facilities, widely extended Piggyback services, faster freight deliveries, and Telex and other improved communications devices. Behind these lay continued improvements in mechanical and electronic equipment, an intensification of research and a streamlining of organisation and administrative machinery, all contributing to the rapidly changing face of transportation.

An overall increase in revenues reflects the general improvement in business conditions in Canada following the recessionary trends of 1958, though the adverse effects of the steel strike in the United States were also felt. Estimates show that tonnage figures for revenue freight handled in 1959 improved by some 3 per cent, or 2,000,000 tons, over 1958. Major volume increases in the movements of ores, concentrates and other mine products, forest products, scrap iron, motorcar bodies and parts, were the main factors in this improvement. Major decreases in revenue freight traffic were registered in grain and grain products, pulpwood, coal and manufactured iron and steel articles. Despite vigorous efforts to improve the passenger revenue position, including a reduction in train miles of unprofitable services and a stepped-up sales campaign marked by new incentive features, passenger train revenues declined by some 3 per cent, compared with a decrease of about 12 per cent recorded in 1958.

At the year-end two particular sets of circumstances serve to underline the continuing railway dilemma of trying to keep revenues in line with ever-rising costs. A Royal Commission on Transportation is in the course of hearing numerous submissions, including those of Canadian National Railways, dealing with such questions as the Crowsnest rates on grain shipments and the entire subject of rate-making which so vitally affects railway revenues. Meanwhile, on the cost side, employees represented by the non-operating unions are in negotiation with the railways following presentation of demands for higher wages and other benefits.

This repetitive squeeze between revenues and expenditures sharpens the need to increase productivity and efficiency so as to serve C.N.R. customers at fair prices, provide satisfactory remuneration to its employees, and earn a reasonable return on capital investment. The need to modernise plant and equipment in the interests of efficiency continues. In such modernisation, the most graphic aspect of which is seen in the conversion to diesel traction, the C.N.R. management keeps prominently in mind the impact of increasing mechanisation and technological change upon its working force. Throughout the C.N.R. system, there is constant planning and discussion of a co-operative nature with union representatives, job supervisors and others to organise retraining programmes, to arrange transfers for employees as circumstances permit, and generally to avoid extremes, as employee displacements become necessary.

The past year saw a continuation of existing programmes of operational improvements. The main line betterment programme on the Western Region continued. Embankments were widened, drainage improved, sleepers re-spaced and improved ballast applied at various locations totalling more than 325 miles. The long-range programme of installing C.T.C. systems on 40 main-line sub-divisions was further extended with the installation of five main-line sub-divisions in 1959. Six sub-divisions are scheduled for completion in 1960.

In 1959 the diesel traction programme for the Central Region was completed, leaving only the Western Region and Detroit Division of the Grand Trunk Western Railway with partial steam operation. By the end of 1959, some 94 per cent of freight and passenger miles and 99 per cent of yard miles were operated by diesel power. A total of 295 new diesel locomotives were scheduled for delivery by the end of the year, bringing the total diesel inventory to 2,024 units.

New diesel repair shops at Edmonton, Alta. and Senneterre, Que., were completed and placed in operation during the year and work has commenced on a third at Moncton, in connection with the new hump yard there. This shop is expected to be completed late in 1960. Plans are currently being prepared for a similar shop at Symington Yard, Winnipeg, with work scheduled to start in the spring of 1960 for completion the following year.

Track laying is expected to be completed this year on a new branch line from Optic Lake to Chisel Lake in Manitoba. It is also expected that the first ballast will be placed under 40 of the 52 miles of track making up the new line. Built to serve the mining development of the Hudson Bay Mining & Smelting Company, the line is expected to be ready for service in June, 1960. The eastern section of the Chibougamau branch line, from St. Felicien, Que., to Cache Lake, a distance of 133 miles, was completed and placed in service late in October. The western section of this line from Beattyville to Chibougamau, a distance of 161 miles, was completed in 1957.

Braking Practice and Developments

THE fundamental problem in designing a railway brake system is to ensure that it approaches but does not exceed the limits dictated by adhesion. Attempts have been made to provide formulae for the calculation of stopping distance when applied to any specific train formation but the variables are so many that it has been found more satisfactory to rely on measured performance obtained under test conditions for all types of train through the entire speed range of each. The stopping distance curves produced from such data may be superimposed on the minimum brake performance curve, or S curve, which shows the maximum permissible stopping distance from speeds of up to 80 m.p.h. on level track for trains fitted with standard brake equipment. The S curve shows the stopping distance in yards to be approximately equal to the square of the velocity in m.p.h. divided by four and a half. While this is of particular value to such as the signal engineer for estimating sighting and stopping distances for signal location purposes, to the railway mechanical engineer it serves only as a basis against which to compare the actual braking performances achieved in the continuing search for improvements in the safety of railway travel and in the cutting of maintenance costs for rolling stock.

A paper, "Some Aspects of Railway Braking," by Mr. R. C. S. Low, Works Manager, Locomotives, Horwich, British Railways, London Midland Region, read at a meeting in London earlier this week of the Institution of Locomotive Engineers, gives much valuable information on constructional details and admirably clarifies the braking systems used in Great Britain. It describes both those features which are standardised and in widespread use by British Railways and certain designs still under investigation. The object has been to provide a picture of developments taking place in this country for the non-expert in matters of braking. For this reason Mr. Low begins with elementary considerations of energy absorbtion and the forces acting on a wheel during braking, followed by a concise statement of the limiting factors involved. Among the latter are: the fact that the coefficient of friction of a cast-iron brake block falls as the force applied is increased; that wheel/rail adhesion appears also to be reduced as speed increases; and that certain composition brake blocks provide improved coefficients of friction but their

application directly to the tyres can adversely affect adhesion by as much as 20 per cent.

Mr. Low describes the basic requirements of a good system and includes two points which are considered worthwhile when seeking ideal braking. Firstly the brake force on each wheel should be applied or released simultaneously, instantaneously, and in proportion to the weight on each wheel through a full range of brake force. Secondly it should be automatically controlled to compensate for the varying brake-block/wheel coefficient of friction and to limit the retardation so that the force at the wheel rim does not exceed the adhesion. Methods of improving brake propogation and release times for the automatic vacuum brake such as the direct admission valve and the automatic isolating valve are explained with the aid of simplified diagrams. He shows how, for example, with the quick-release vacuum brake the exhauster pipe and high-vacuum reservoirs are maintained at 29 in. vacuum in the running position while the train pipe is maintained through the feed valve at 21 in. On release after a brake application, air is drawn out of the train pipe by the exhauster and, in addition, by the high-vacuum reservoir through the a.i.v. until the vacuum in the reservoir is reduced to 19 in. when the valve closes. By this arrangement release times of 12 sec. can be achieved for a two-car set after a brake application in which the brake cylinder vacuum has been reduced to zero. Without the quick-release feature the release time would be of the order of 30 sec.

A recent development concerning variable leverage systems for loaded/empty conditions is to make the changeover automatically dependent on the weight of the vehicle. The end of one axle spring is linked to a control spring in the changeover valve. This can cause the fulcrum rod for the empty condition of braking to be released so that, in subsequent brake applications, the load rod is brought into use and the leverage increased accordingly. With disc brakes, because of the absence of a roughening agent at the wheel rim it is customary to fit some form of anti-skid device. One form has a device on the end of an axle to detect deceleration equivalent to a reduction in vehicle speed exceeding 2·5 m.p.h. per sec. after which the control valve is operated electrically to allow a partial build-up of vacuum in the brake cylinder from the release reservoir. The release-reservoir/brake cylinder volume ratio is 8: 1 providing some five releases down to 12 in. release-reservoir pressure. It is considered that this number of releases would not be required, even under adverse conditions, before a stop was achieved.

Improvements to the automatic air brake with electro-pneumatic control as used on electric multiple-unit stock operating in self-contained services in Great Britain, include cam-operated rubber-seated valves for the brake controller self-lapping mechanism. A new equipment with a different principle of operation has electrical contacts operated by air pressure and the same movement of the brake controller handle covers either e.p. or automatic air operation in the event of electrical failure. In both methods the operation of the brake is self-lapping and can provide gradual application and release. On London Transport Underground stock the automatic retardation control usually provided has contacts made by the mercury in circular switch tubes for selected rates of braking. The arrangement takes into account variations in the brake-block/wheel coefficient of friction and the average weight of the trains. In addition the application mercury switch can be mounted on a tilting bracket which can be varied with the position of the brake valve handle to provide a self-lapping feature which selects a braking rate rather than a brake-cylinder pressure. Latest developments in this respect have associated the tilting mercury switch with a regenerative brake system. When a brake rate is selected by the brake handle the air brake e.p. application will only be made if there is insufficient resisting torque from the traction motors.

Speed-sensitive braking is another development described by Mr. Low. He states that recent high-speed trains with electro-pneumatic brakes have been provided with a two-stage system with a booster valve and supplementary reservoir giving automatically-selected brake percentages of some 140 per cent above 40 m.p.h. and 88 per cent below. This shows the value, for comparative purposes, of relating as a percentage the nominal brake force to the vehicle weight. The former is the product of available cylinder pressure, cross-section area of cylinder, and mechanical advantage of rigging.

British Railways Position in November

(By a correspondent)

AS in October, British Railways handled 3 per cent more freight train traffic in four weeks to November 29. Carryings of 19,727,000 tons were 644,000 tons more than in the poor year, 1958, when November traffic was 3,353,000 tons, or nearly 15 per cent below 1957. Compared with the good year 1953, the railways lost 4,172,000 tons of traffic, a drop of 17 per cent.

Last year merchandise accounted for 3,314,000 tons, an increase of 244,000 tons on 1958, nearly 8 per cent. That entailed the working of 43,487,000 more ton-miles, a rise of 10 per cent. Merchandise receipts were £269,000, or 3 per cent higher, so that little additional net revenue may have been earned.

A 10 per cent advance of 432,000 tons in minerals caused an 11 per cent increase of 39,270,000 ton-miles. A resultant rise in receipts of £277,000 was at the rate of 7·6 per cent.

On an average, merchandise and minerals were hauled for longer distances of 135 and 76 miles respectively last year, while the haul of coal and coke at 52 miles was 2½ miles shorter. Though coal carryings of 11,822,000 tons were 33,000 tons, or 0·3 per cent lower, coal ton-miles were down 21,474,000, or 3·2 per cent, and receipts dropped by £626,000, or 6·6 per cent. These downward trends were modified in December by the usual spurt to increase coal output before Christmas Day, but they are likely to continue in 1960. Steelmakers are busy over the introduction of new methods for converting iron into steel, which will reduce the quantity of fuel required for the old process of manufacture. The changeover will be in the national interest, but cannot benefit the railways.

No 12 of *Transport Statistics* gives details of freight train working for 12 weeks to November 29. Train-miles totalled 28,925,000, a reduction of 345,000 (1 per cent). Steam train-miles were cut by 927,000 (3·2 per cent) to 27,628,000, while diesel train-miles increased by 579,000 to 898,000. The Eastern Region worked 410,000 fewer steam train-miles (8 per cent) and 293,000 more diesel train-miles, bringing its diesel mileage to 477,000, or 53 per cent of the all-line total. The Eastern also raised its diesel train speed to 10·3 m.p.h., compared with 8.8 m.p.h. for its steam trains. The other heavy Regions made little progress with the change of motor power, but the Southern Region recorded a speed of 10·6 m.p.h. for a number of diesels installed last year.

Steam train speed declined everywhere. The North Eastern slowed down its speed by 7 per cent to 9·39 m.p.h., though the General Manager told us on January 1 that his freight train services were accelerated regularly and added that 555 fully-braked services originated in the Region weekly. Priority given to these services may be spoiling the mobility of the ordinary freight trains, which used to be held at a high level. The North Eastern is a production ground and in the 12 weeks loaded 1,135,000 wagons, over 18 per cent of British Railways forwardings. On an average its wagon load was 11·7 tons against an all-line average of 9·8 tons at starting point.

The Eastern Region had the largest train load of 172 tons, 22 tons above the all-line average. Its hourly output of freight train operation was 1,298 ton-miles, 12 per cent above the general average of 1,149. The Eastern is certainly setting the pace in efficiency of freight train working.

The rolling stock position at November 29 was far from being satisfactory. Of a net operating stock of 13,762 steam locomotives, 2,584 (18·7 per cent) were under repair. Of 340 diesel-mechanical and diesel-hydraulic locomotives, 39 or 11·4 per cent, were defective. Worse still, 181 of a stock of 1,374 diesel-electric locomotives, or 13 per cent, were unserviceable. Altogether 2,816 of a fleet of 15,561 locomotives of all types were cripples, leaving 12,745 available for traffic, against 13,521 at a comparable date in 1958. The loss of 776 active locomotives, at a time when freight volume improved slightly, slowed down the movement of loaded wagons and hampered the distribution of empties.

At November 29, the railways owned 949,080 wagons, but 65,900 (nearly 7 per cent) were under repair. The number in traffic was 883,180 against 967,030 a year earlier, a loss of 83,850 wagons, or 8 per cent. Inevitably complaints of wagon shortage arose in various districts. Discreet use has not been made of the facilities for wagon building and repairing which British Railways took over in 1948.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Need for Vitalised Statistics

January 15

SIR,—On January 9, subscribers to the series of *Transport Statistics*, published by the British Transport Commission, learned that our railways forwarded 1,340,000, or 5 per cent, fewer wagons in 48 weeks to November 29, 1959, than in the same period of 1958, though in the last 12 weeks of that time there was a small increase of 35,000.

A week later *The Times* reported that, in the week ended January 9 this year, the American railroads loaded 591,515 wagons, an increase of 40,849, or 7 per cent, on the corresponding week of 1959. That result was achieved in spite of a decrease of 46,865, or 15 per cent, in grain loadings, which had been heavy in recent times.

These American results reflect the current trend of events for the guidance of the Shippers Advisory Boards, which confer with the railroads about questions of wagon supply. Persistent complaints about wagon shortages in the last quarter of 1959—by no means a time of heavy demand for rail transport—emphasise the need for full and prompt information about the situation in our own country.

Yours faithfully,

SALVOR

Westminster, S.W.1

Design of Passenger Coach Bogies

December 16

SIR,—Mr. R. M. Hancock's letter, in your issue of September 18 last, is, quite understandably, in defence of that part of his paper concerning this subject. Even if the British Railways bogie does ride well when new, it appears to see very little service before it is riding very badly. A coach in which I rode recently, built in 1928 and fitted with "Doncaster" bogies, afforded a far better ride than the new-looking vehicles fitted with B.R. bogies which made up the rest of the train.

The only thing to do now is to examine the mechanics of the B.R. bogie. At the sub-bolster outer ends there are four short links, one pair on each side of the bogie sole bar, each with a long travel helical compression spring. If one views this arrangement transversely one sees, ignoring the other end, that the bolster will want to move in a parallel motion. Does this happen in practice? No. When the coach body rolls to one side the sub-bolster will tilt. The inner pair of links, therefore, must act as a pivot point. The weight on these links will then be unequal, because the outer pair of links will be relieved of some of its weight. Such a condition will, I am certain, start hunting, irrespective of running on straight or curved track. This will build up the more the car body sways.

Another fact is relevant here: a bicycle possesses "balance," which is, I suppose, related to the gyroscope. This balance is very sensitive. It applies just as much to a four-wheel bogie, more particularly when the pivot is at the geometrical centre. It follows that if, at each end of the bogie framework, one hangs 150-odd lb. of brake beam and blocks which can swing sideways, then hunting can be started by this motion under the slightest "provocation," *i.e.*, rail joints, the wheels riding up their cones, tiny kinks in the rail itself, and even a small stone on the rail.

Another thing which upsets this balance is the placing of the sub-bolster links outside the rail gauge. This practice is dangerous, for if there is a sudden weight transfer to those links, then de-railing can take place instantaneously. The derailments, in both of which B.R. standard bogies were involved, at Watford in 1952 and at Slough this year, were entirely due to this condition. I note that on the bogies on the Western Region diesel—hydraulic locomotives, the divided weight of the body is carried at points about 26 in. wider than the rail gauge. It is only a matter of time before one of these machines will be de-railed at high speed. It will be no good blaming a "broken rail."

It is gratifying that the new electric stock on the Manchester to Bury, Colchester to Clacton and Walton, and London, Tilbury & Southend lines has the Doncaster bogie. But even this bogie, good as it is, should have both sets of swing links at no more than the 55 in. centres, the present figure for the main bolster links. The essence of the design of the Doncaster bogie is its simple arrangement and long links, all about 20 in.

As to long-welded track, one obvious improvement is to fit the former Southern Railway Ellson joints between each long length and so achieve continuous quiet running. I well remember the fitting, in 1936 I think, of the up and down main roads between Putney and Point Pleasant, on the Windsor line, with three lengths of 57-ft. rails welded together, and Ellson joints in between each. The improvement in running was remarkable. This example still exists, I believe.

I instance my personal experience of a cast-steel bogie fitted to oil tank wagons overseas, which was de-railed, empty or full, on bad track for one reason only. The side bearers were a total of 6 in. wider than the track gauge. I could even demonstrate this with scale models, at the time, though the explanation was not accepted.

Yours faithfully,

H. E. NORMAN, A.M.I.E.D.

4, Silver Street, Dursley, Glos.

First All Roller-bearing Locomotive

December 18

SIR,—I was interested to read in your December 11 issue of the Northern Pacific locomotive No. 2626, formerly Timken No. 1111, believed to be the first engine in the world to be fitted with roller bearings throughout.

On looking through my records I find that experiments with roller bearings were carried out earlier than in 1933. As far back as 1911, or about then, some locomotives were equipped with self-aligning ball bearings, but whether or not they were fitted throughout I cannot say. The Skefko Ball Bearing Co. Ltd., however, was prominent in this respect.

I find it amazing that the railways of Britain should have been so far behind those of other countries regarding this type of bearing, when study of the economic aspect shows that their adoption would have been beneficial in several respects.

Yours faithfully,

COLIN P. LOVEMORE

13, Elliston Road, Redland, Bristol, 6

Southern Region Motive Power

January 5

SIR,—British Railways, Southern Region, has a lot on its plate in completing the Kent Coast electrification scheme, but little has been heard of the motive power plans for its Western Section. The modernisation plan apparently makes no provision for further electrification westward. In view of the seasonal character of much of the passenger traffic and the relatively light goods traffic electrification, even at 25 kV., would not seem to be an economic proposition in the foreseeable future.

The Southern Region has a magnificent stable of steam engines, but their time will come; and they are now competing, to Exeter and Plymouth with the Western Region diesel-hydraulic locomotives.

May we assume that Waterloo has made its plans for introducing diesel power, whether locomotives or multiple-units on the Hampshire model? Perhaps the Southern Region could enlighten its many friends. It would be a pity if the heir to the London & South Western were to fall behind the heir to the Great Western Railway in the introduction of modern motive power.

Yours faithfully,

G. A. ALLAN

17, Argyll Road, W.8

THE SCRAP HEAP

On the Right Track

Press advertisements in Australia for the Renault Dauphine motorcar use the following catch line :—

"Takes the Toughest Road,
The Tightest Corners
As Safely as if on Rails."

—*From the "Victorian Railways News Letter."*

Hovertrains?

Mr. Ernest Marples, Britain's Minister of Transport, who arrived in Washington from Chicago . . . said that the Ford Motor Company is working on an invention of a "hovercraft train." The train would travel at speeds of up to 150 m.p.h., moving on a cushion of air 1,000th of an inch above the rails. "If it succeeds" Mr. Marples said, "I would be very interested for our nationalised railways. I would not be surprised if there might be quite a sudden comeback of the railways with such modern inventions."—*From the "Evening Standard."*

End of an Anarchist

The Spanish anarchist and guerrilla leader, Francisco Sabater, a wanted man for 14 years, was caught and shot dead near Gerona on January 5, after a chase by the Civil Guard. . . . He escaped on January 3 from a farmhouse surrounded by the police, and after walking about 12 miles during the night jumped a slow train and, gun in hand, told the driver to drive non-stop to Barcelona. At Massanet, whence the line to Barcelona is electrified, Sabater, his rucksack full of grenades, had to change trains. He ordered the engine driver to slow down shortly before entering San Celonix and dropped from the moving train. Entering the town on foot, he went to the home of an old anarchist friend and asked for refuge. The friend refused. As Sabater tried to force his way into the house, the Civil Guard and civilians, warned by the train crew, spotted him. One civilian . . . called on him at gun point to surrender. Sabater fired and the man fell to the ground. But the reports say that as he lay injured he raised his sub-machine gun and shot and killed the guerrilla leader.—*From "The Guardian."*

Safe and Quick by Rail

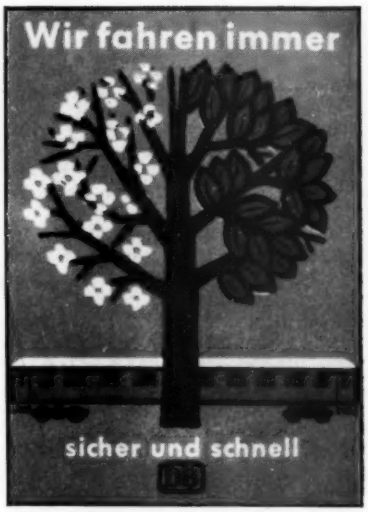
German Federal Railway publicity includes use of stickers on outgoing correspondence. The sticker reproduced bears the wording: "We always transport safely and quickly", with the initials of the Deutsche Bundesbahn. The tree is brown, with white blossom, on an orange background. The passenger coach is bright green.

Snap

In an effort to help English-speaking tourists visiting Japan and travelling by Japanese National Railways, one of the local offices in Tokyo has adopted a special device to overcome the language barrier. They use a small collection of cards that carry typical expressions, both questions and answers, printed in English and Japanese. The enquirer is shown the cards and a question is selected. The officer then selects a card containing a suitable answer.

Sic Transit

Eminently sensible is the Norfolk County Council's plan to buy sections of the old Midland & Great Northern Joint railway line, closed last February, for conversion into roadways. There the route lies; no sharp bends, no steep gradients, no unbridged intersections, and no prolonged negotiations with property owners and objectors. Only we old railway-fanciers will shed a tear at the thought of scooters and saloons bustling down the stretch from Aylsham to Potter Heigham where once the noble locomotive roared, or at any rate rumbled along. Will any traces of the great days remain? A signal here, set permanently (and now so misleadingly) at "safety," a crumbling station there? Will passengers waiting for their buses be permitted to huddle around the original empty stoves at Stalham and North Walsham? Probably not.—*Reproduced by permission of "Punch."*

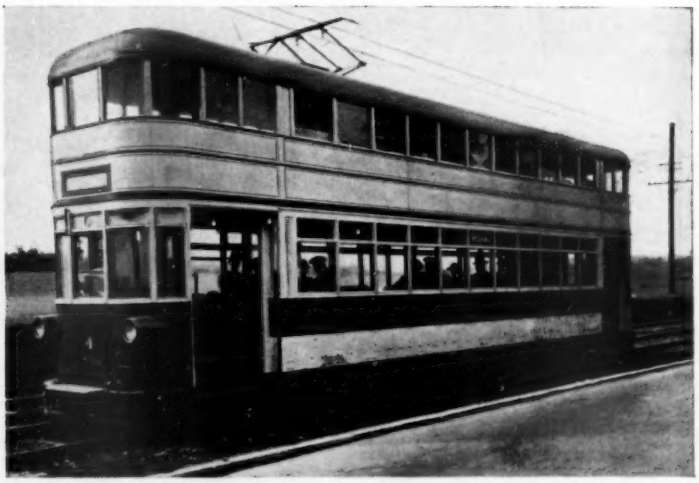


Sticker used on German Federal Railway envelopes

Steam and Electric Working on the Swansea & Mumbles Railway

(*See our January 15 issue*)

Steam train at Rutland Street terminus, near Victoria Station, Swansea, in August, 1928



Electric car seating 106, introduced in March, 1929, the largest car in Britain, with entrances on landward side of line only

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Manganese-Steel Rails

The South African Railways has decided to use a special type of rail with a manganese content of up to 2 per cent on all curves where heavy wear is experienced, and where the longer life of these rails will offset their higher cost. An order was recently placed with Iscor for the supply of 1,000 tons of 96-lb. rails of this type for delivery during the present financial year, and is the culmination of successful tests carried out with rails of a high manganese content on the Natal main line between Volksrust and Durban.

A small quantity for test purposes was specially obtained from Iscor while approximately a 1,000 tons were bought from Austria, where the rail had its origin. The results have been so good that after five years of use the original rails are not yet worn to a degree which would indicate their full life expectancy.

PAKISTAN

Manufacture of Wagons

The Railway Workshop at Pahartalli in East Pakistan is being developed to manufacture 400 wagons a year. Manufacture of wagons will start in about a year. In the first year some 200 wagons will be turned out, the target being 400 wagons and 25 coaches every year.

VICTORIA

East Camberwell Flyover Completed

The final stage in the doubling of the Camberwell-Alamein suburban branch as far as Ashburton was completed on November 30, 1959, when the flyover at East Camberwell was opened for traffic. The total cost of the project was £470,000 and consisted of doubling this branch line for a distance of 3¼ miles from Camberwell to Ashburton leaving the last mile from there to Alamein single. Included in the project was the construction of new station platforms, buildings, and additional bridgework. The new flyover is used for down Alamein trains.

Immediately on leaving Camberwell the latter are switched on to the track up the embankment leading to the flyover, which is reached in a little under half a mile. They are carried on the single down line on top of the flyover across the double tracks of the main Melbourne-Box Hill route and make a curving descent behind the East Camberwell Station into Riversdale which is a mile from Camberwell.

Double line working between Riversdale and Ashburton was instituted over two years ago but only single line operation was possible between Camberwell and Riversdale pending completion of the flyover. The latter was substantially finished some six months ago but track work had not been attempted. This was commenced a few months before the end of last year and completed in November.

The flyover consists of a single track over three openings or short tunnels. At present only two of these are in use serving the up and down Box Hill tracks. When the fast two-way track from East Camberwell is completed the centre opening will be used for this, while the opening not at present in use will handle traffic on the future up track. During the heavy peak hour traffic through running of full length trains is in operation between Melbourne and Alamein, but in the slack periods of the day a local service of either two or four carriage trains is worked from Camberwell.

With the operation of double line working on the branch, track alterations at the Melbourne end of Camberwell Station became necessary and were carried out. These allow the local train to shunt across to the down platform during off peak periods, obviating the need for passengers for the branch line to change platforms. They were also necessary to give the branch train access to the flyover.

Photo] *[Guy Bakewell*

Down Camberwell-Alamein branch train crossing the new flyover near East Camberwell, Victorian Government Railways

CANADA

Nova Scotian Hotel Extension

The Nova Scotian Hotel at Halifax N.S., one of the chain of hotels operated by Canadian National Railways, is currently being extended by the addition of an 11-storey wing. This new wing will more than double the capacity of the hotel, providing accommodation in 327 rooms. The extension is scheduled for completion in mid 1960, and will make the Nova Scotian the largest hotel east of Quebec City. Public rooms for conventions and meetings will be enlarged to accommodate 600 people at banquets and 800 at meetings, while the extended ballrooms will handle 430 at banquets and 630 at meetings.

ARGENTINA

Threat of Strike Action

The last few days of December were marked by unrest among railwaymen, who threatened non-collaboration with the companies, working to rule, and periodical strikes of 24 hrs. Their grievances were that improvements in wages and working conditions were overdue, and that the Government had announced that the annual bonus would be paid in instalments.

Because of the seriousness of the situation, the Government called a full Cabinet meeting and all the factors were carefully considered. Finally, the men's demands were met almost in their entirety, the Economic Minister informing the public by radio that the increases in rates which were under study would have to be stepped up to cope with the men's demands.

The second point, payment of yearly bonus, was settled by an official promise to pay in full before the middle of January.

Increases in Rates and Fares

As a consequence of the wage demands put forward by the men, it was found necessary to re-calculate the pending increases in rates and fares. A hurried study was made and the increases were placed into effect as from January 1, announcements being made on station blackboards as there was no time to print posters. First-class fares were increased by 40 per cent, and one-class and second-class fares will bear a relationship of 85 per cent and 70 per cent to the former. Bed and pullman car tickets have been stepped up according to distance, and goods rates suffered an

increase of 50 per cent. Buenos Aires Transport has increased the underground railway rates from one to two pesos. Tram and omnibus fares have been augmented accordingly. More than half the increased revenue goes to finance the new salaries and wages, the remainder being destined to reduce the general railway deficit.

BRAZIL

Track Re-laying

Rede Mineira is using 153,000 tons of Japanese rails and accessories to re-lay the Garcas de Minas-Belo Horizonte and Angra dos Reis-Goiandira-Brasilia sections. Twenty-five unimportant stations have been closed as an economy measure.

Budget Allotments in 1960

The 1960 Budget allots 12,338 million cruzeiros to the National Railway Department for reforms, exclusive of the amounts to be expended by the Federal Railways network out of its own resources. The principal works in charge of the Department are as follow :

Construction of the Campinho-Ubaitaba section and connection to E. F. Ilheus at Poiri ; laying of the Cruz das Almas–Santo Antonio de Jesus and Ubaitaba–Jequia–Contendas extensions to connect with the E.F.F. Leste Brasileiro to Nazare and Ilheus railways at a total cost of 300,000,000 crs.

Extension of the E.F. Goias to Araguaiana, on the borders of Mato Grosso, from Goiania and Pires do Rio to Brasilia, the new federal capital, at a cost of 410,000,000 crs., and extension of the Brazil Central Railway from Pirapora to Brasilia at a cost of 300,000,000 crs.

Construction of branch lines from Belo Horizonte to Itabira and from Nova Era to D. Silverio, to connect the Brazil Central Railway to the E.F. Vitoria-Minas; also from Lima Duarte to Bom Jardim, to link up the Brazil Central to Rede Mineira, at a cost of 210,000,000 crs.

Continuation of work on the extension of the Parana-Santa Catarina Railway from Maringa, on the Ourinhos-Londrina line, to Guaira, the terminus of the E.F. Mate Laranjeira on the Paraguayan frontier; 90,000,000 crs.

Extension of the western trunk line of the R.F. do Nordeste to Salgueiro, and construction of the Recife-Olinda and Bom Jardim-Umbuzeiro branches; 245,000,000 crs.

Construction of the General Luz-Mussum-Passo Fundo-Irai section connecting the northern part of the State of Rio Grande do Sul directly to Porto Alegre and forming part of the principal southern trunk line, reducing the distance from Sao Paulo to Porto Alegre by 181 miles; 450,000,000 crs.

Construction of Itangua-Engenheiro Bley section of the principal southern trunk line in Parana, at a cost of 400,000,000 crs., and the section from Mafra, on the R.V. Parana-Santa Catarina Railway, to Barra do Jacare, in Rio Grande do Sul; 600,000,000 crs.

SWITZERLAND

Cars Through the Simplon Tunnel

On December 1, new facilities were brought into operation at Brigue and Iselle for the transport of motorcars through the 12¼-mile Simplon Tunnel. The price charged for a car carrying up to eight persons is Sw. fr.30 (£2 10s.), and if the journey is through both the Lötschberg and Simplon Tunnels between Kandersteg and Iselle, the charge is Sw. fr.50 (£4 3s. 4d.). The driver and two passengers are carried without additional cost, but any further passengers require to pay at the ordinary second class fare between Brigue and Iselle (5s.).

There are lower charges for motorcycles, motor-scooters and so on. In the case of lorries, provided they conform to certain maximum dimensions, ambulances, and other vehicles, the price for transport is based on the weight. The installation at Iselle is not able to handle the larger vehicles, such as motorcoaches and large lorries, and these must travel through to and from Domodossola.

FRANCE

Claims Reduction in 1959

As the result of careful analysis of the causes of claims, carried out in 1958 after a rise in the incidence of claims during the immediately preceding years, the S.N.C.F. reports a significant decrease during the first half of 1959. During this period the number of cases of damage went down from 175,000 in the January-June period, 1958, to 141,000 in the corresponding period of 1959. The amount paid out in claims under this head totalled 873 million francs in the first six months of 1959, in comparison with 1,075 million francs in 1958. Although the *tonne*-kilometrage went down by 2·3 per cent in 1959 as compared with 1958, the reduction in damage reported was 19 per cent, while the ratio between claim payments and receipts changed from 0·75 per cent in 1958 to 0·55 per cent in 1959.

NORWAY

Increase in Fares

Under the Norwegian Budget for the half-year beginning July 1, 1960, State Railway fares are to be raised by 15-20 per cent. The Finance Minister's proposals provide more funds for new electric power services and improvement of roads.

Publications Received

Narrow Gauge Railways of Europe. By Peter Allen and P. B. Whitehouse. Hampton Court, Surrey: Ian Allan Limited, Craven House. 9½ in. x 7½ in. 172 pp. Illustrated. Price 35s.—Now that steam has been replaced by diesel or electric traction on many European narrow-gauge railways, and not a few undertakings have been closed or are threatened with closure, a record of their steam locomotives and sidelights on their operation is timely. The first part, entitled "The Grand Tour," describes journeys on, and outlines the working methods and steam motive power of, narrow-gauge lines in many regions. These range from private railways in Jugoslavia, Sweden, and Switzerland, which resemble main-line railways in many respects, to the Dutch steam train. The second part of the book briefly describes the narrow-gauge railways extant in the more accessible parts of the Continent. Electrically-worked lines are excluded. The authors make some stimulating observations, with much diverting description.

"*Kodama*" *Tokyo–Osaka Express.*—The management of the Japanese National Railways, Marunouchi, Tokyo, has issued an attractively produced 12-page brochure, illustrated in colour and monochrome, on the eight-car multiple-unit electric express train, the "Kodama," which runs between Tokyo and Osaka. The stock, built by three different Japanese manufacturers, was described in our issue of December 19, 1958. The photographs in the J.N.R. publication are well chosen and reproduced.

The Electric Tool User.—The current issue of the house journal of Wolf Electric Tools Limited has on its front cover an illustration of modifications being made to a works steam locomotive of Dorman Long & Co. Ltd. with the aid of a Wolf portable electric drill, morse taper chuck model, mounted in a standard drilling fixture. Many other forms of production and maintenance requiring drilling and grinding work are shown throughout the journal and these include the manufacture of precision machinery using Limpet electromagnetic drill stands for ease of operation under difficult working conditions. Copies may be obtained from Wolf Electric Tools Limited, Pioneer Works, Hanger Lane, London, W.5.

Holidaymaking, 1960.—This summer holiday programme of Thos. Cook & Son Ltd. and Dean & Dawson Limited is increased to 72 pages, eight more than last year. The virtual abolition of currency control has enabled many cumbersome details, previously necessary, to be omitted, and has afforded scope for producing a more attractive programme. New holiday centres include five in Portugal, four in North Africa, and several on the coast of the Adriatic and elsewhere in Italy, and in the Austrian Tyrol. Other new features are a 10-day tour of Greece by air and motorcoach, and a 16-day tour in the U.S.S.R., Poland, Germany, and Belgium for the moderate inclusive charge of 78 guineas. Holidays are offered also in Canada and the U.S.A. Rail travel is included in many of the holidays. The programme, as usual, is attractively produced, with photographic and other illustrations, some in colour.

Bridge Reconstruction at Evesham, Western Region

Welded plate girders with prestressed concrete deck units replace 85-yr.-old wrought-iron girders

THE railway bridge carrying the Western Region main line from Oxford to Worcester over the River Avon near Evesham was reconstructed in 1959. Built in 1875, this bridge consisted of four wrought-iron plate girder deck type spans (2 x 36 ft. and 2 x 54 ft.) supported on cast-iron screw-pile cylinder piers, and decked overall in timber. Working stresses were high in the wrought-iron girders; the difference in deflections under the loaded and unloaded spans further accentuated by the presence of a crossover on the bridge led to trouble with the transverse timber decking which could not be made watertight. Settlement of some of the cylinder piers had led to a rebuilding of the centre one in masonry in 1919. So, when the timber decking reached the end of its life, it was decided to reconstruct the whole of the superstructure, at the same time halving the number of spans and eliminating the remaining screw pile piers.

The new spans follow standard modern practice, and consist of welded plate girders with precast reinforced concrete well-deck units resting on concrete pads cast in short lengths, and dowelled to the top flanges. The permanent way is standard with cross sleepers on 6 in. of ballast. The crossover has been re-sited clear of the bridge. Each pair of girders under each track has complete lateral bracings between the top flanges as well as adequate sway bracings, but there is no connection between the spans separate under each track. At the pier, particular care has been taken to centralise the reactions, the main girders oversailing one another, piggy-back fashion. Welded mild-steel knuckle-pin bearings are fitted, those on the pier being fixed so as to present an uninterrupted support to the concrete deck, the joints between the units of which are sealed and made watertight. Bronze slipper plate sliding bearings are provided at the abutments.

Interlaced Tracks

At first, the tracks were interlaced over the Up line spans, and the engineers were given complete occupation of the Down line spans, the position being reversed after that half of the bridge had been dealt with. This arrangement had a direct bearing on the strengthening of the pier. As constructed in 1919, the centre of the masonry was pierced by a 10-ft. arch above the 2-ft. thick rings of which there was ample depth to accommodate the 4-ft. 6-in. deep girders of the original spans. But the new girders for the 98-ft. 8-in. long spans are 7-ft. 6-in. deep, and it would have been difficult to fish-belly these girders and at the same time retain the single centrally-placed bearings on the pier. The masonry had to be cut down below the level at which the reactions could be properly dispersed without overloading the arch. The pier was strengthened with a prestressed concrete bedcourse precast and erected in two halves with a gap of 2 in. between the two parts which were subsequently prestressed with a load of 3,192 tons. Each part of the bedcourse weighed 30 tons, was reinforced to carry the reactions from single-line loading before prestressing, and rested on hardwood packing over the arched part of the pier, which in turn was temporarily propped and strutted.

This temporary strutting in the relieving

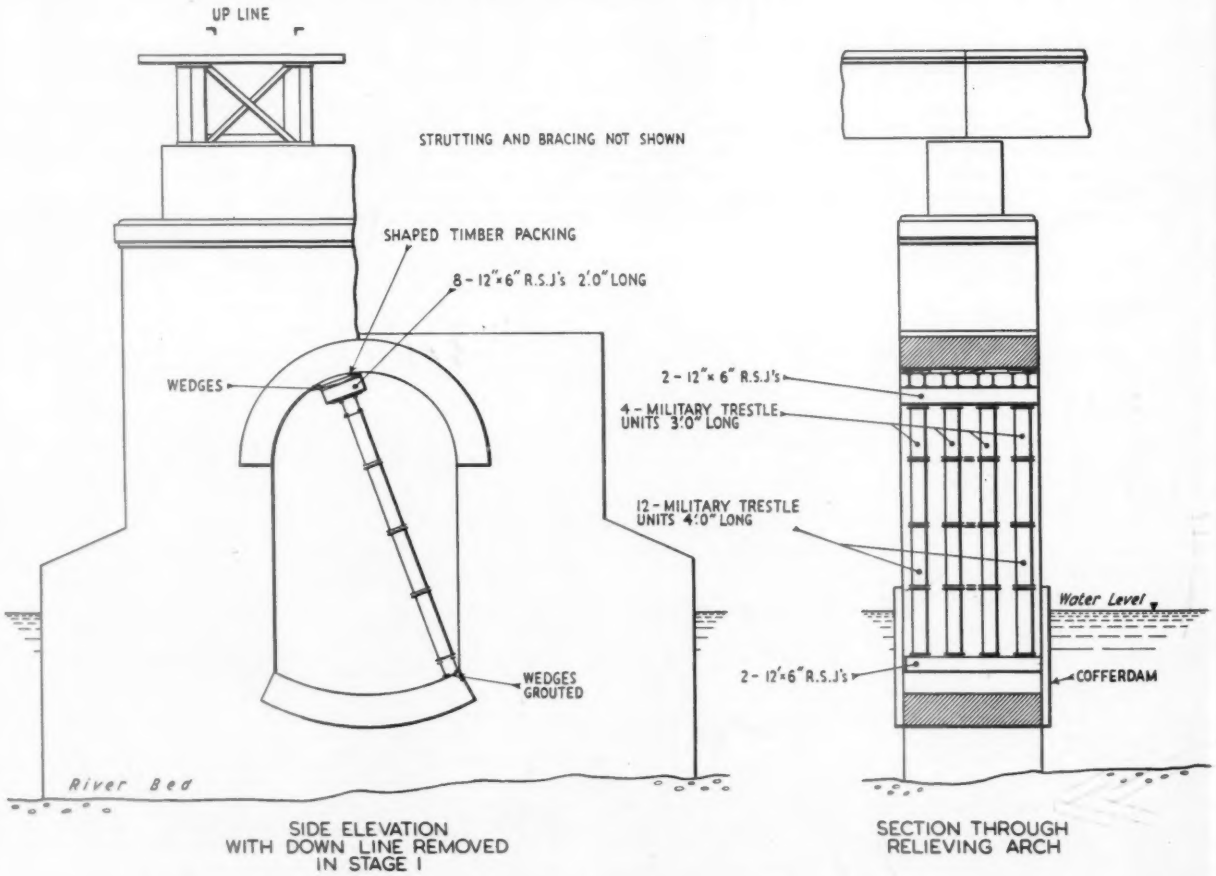

UP LINE
STRUTTING AND BRACING NOT SHOWN
SHAPED TIMBER PACKING
8 - 12"×6" R.S.J's 2'0" LONG
WEDGES
WEDGES GROUTED
River Bed
SIDE ELEVATION WITH DOWN LINE REMOVED IN STAGE I
2 - 12"× 6" R.S.J's
4 - MILITARY TRESTLE UNITS 3'0" LONG
12 - MILITARY TRESTLE UNITS 4'0" LONG
Water Level
2 - 12"×6" R.S.J's
COFFERDAM
SECTION THROUGH RELIEVING ARCH

Fig. 1—Temporary strengthening of centre pier

arch of the pier was provided by military trestling as shown in Fig. 1, four struts being provided in the first stage.

This arrangement was necessary as the relieving arch became very unevenly loaded under traffic and crane working after the pier had been cut down almost to the arch ring on one side to allow the first half of the P.C. cap to be placed. In these circumstances, the arch, which was already cracked through the crown, was assumed not to be effective and was discounted.

Struts Temporarily Doubled

After the new Down line superstructure had been erected, the struts had to be reversed and doubled to take temporarily the thrust of the increased weights imposed on the centre pier following the reduction of the spans from four to two, in addition to the uneven loading of the relieving arch. (See illustration.)

The concrete bedcourse was specified to have a cube strength of not less than 8,000 lb. per sq. in. at 28 days, and tests showed that this figure was exceeded. Prestressing was on the Magnal-Blaton system, the 14 bundles each of sixty-four 0·276-in. diameter wires (ultimate 110

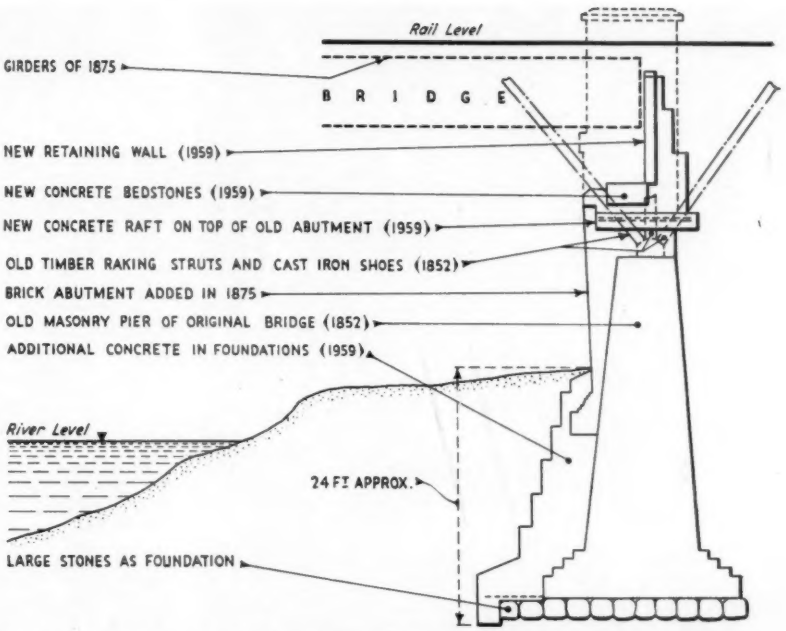
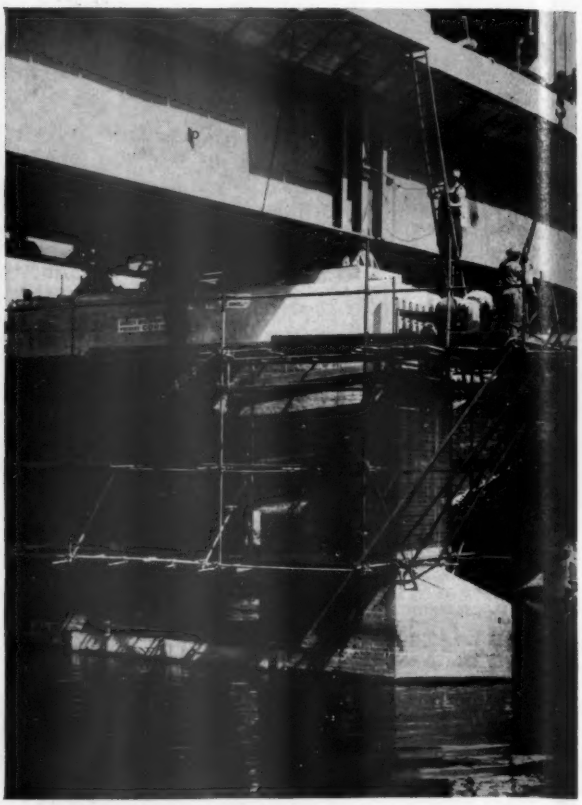
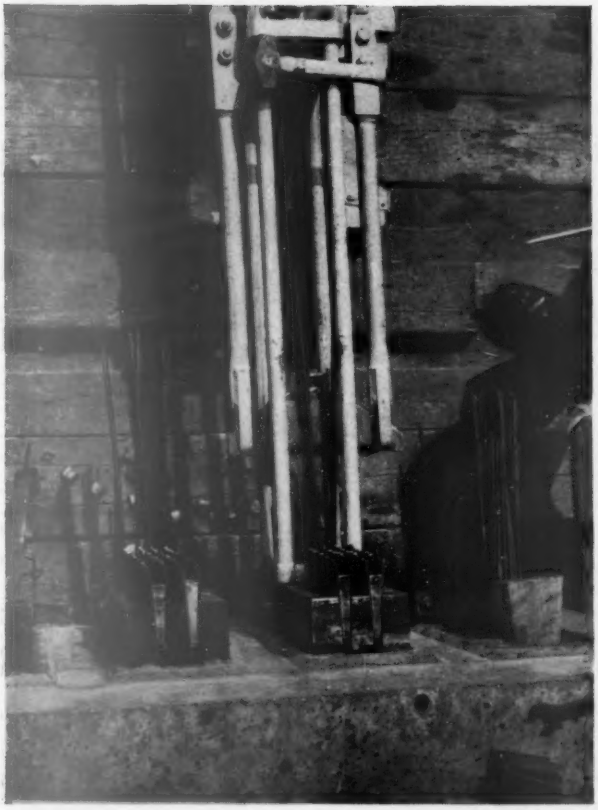

Rail Level
GIRDERS OF 1875
B R I D G E
NEW RETAINING WALL (1959)
NEW CONCRETE BEDSTONES (1959)
NEW CONCRETE RAFT ON TOP OF OLD ABUTMENT (1959)
OLD TIMBER RAKING STRUTS AND CAST IRON SHOES (1852)
BRICK ABUTMENT ADDED IN 1875
OLD MASONRY PIER OF ORIGINAL BRIDGE (1852)
ADDITIONAL CONCRETE IN FOUNDATIONS (1959)
River Level
24 FT APPROX.
LARGE STONES AS FOUNDATION

Fig. 2—Abutment, showing alterations and strengthening of foundations

Plan view of bedcourse, showing top row of sleeved bundles of prestressing wires





Top left : Placing Down line sections of bedcourse on pier. Top right : Pier, showing strutted arch, concrete bedcourse, timber packings under centre portions, centralised knuckle bearings, and piggy-back arrangement of girders. Bottom left : Plan view of prestressing wires. Bottom right : Up line spans being braced. Note interlaced tracks on Down lines

The completed bridge

tons per sq. in.) being threaded through ducts 8½ in. x 3 in., before being stressed in pairs of wires in a specified order. Three jacks were used at a time, the wires being stressed from one end only. A dry rich concrete of 1:1:1½ with a water/cement ratio of 0.25, mixed in a pan mixer, was rammed in the 2-in. gap between the two halves. Finally, after prestressing, cement grout was forced at a pressure of 30 lb. per sq. in. into the ducts, and the wedges and sandwich plates were encased in 6 in. of concrete covering the ends of the bedcourse. The prestressing was carried out without occupation, the actual stressing being done only between trains. The centre of the prestressing force was 5 in. below the centroid of the bedcourse, and after stressing, the beam had a camber of about 1/16 in. Withdrawal of the timber packings completed the successful transfer of the load from the bedcourse clear of the arched portion of the pier.

Extra Weight on Abutments

As the spans had been reduced from four to two, extra weight was imposed on the two abutments, and considerable strengthening had to be carried out on both to meet modern requirements, as shown in the diagram of the Evesham abutment, Fig. 2.

The original bridge, built in 1852, had masonry piers and a timber superstructure, being founded on large stones at about 24 ft. below ground level.

In 1875, a brick abutment was added, with foundations at a higher level to raise the original masonry pier and convert it into an abutment. Subsequently, the top of this abutment became cracked and moved out of plumb, so the top has been demolished, a concrete raft being laid over the top of the old masonry pier and new bedstones and a retaining wall of brick-faced concrete built to accommodate the new girders.

New Concrete Foundation

To provide additional support to the old foundations of the brickwork added in 1875, a new concrete foundation has been added, taken down to the old masonry pier foundations, and reinforced with old rails.

On the Worcester side of the river, the abutment was strengthened in a similar manner, but the original foundations were not so deep as on the Evesham side.

The main girders were erected one at a time, plumbed and aligned with the aid of parallel drifts in the lateral and sway bracings. The connections were completed with ⅞-in. high strength bolts (45/55 tons per sq. in. ultimate) tightened to a torque of 390 lb. ft. There was neither riveting nor welding on site, and with the surface of the steelwork prepared by pickling (which removed all millscale) and painted two priming coats, red lead and red and white lead respectively, and the under and final coats of micaceous iron ore paint applied in the shop before delivery, the amount of work on site was kept to a minimum. The contact surfaces of the parts joined with high strength bolts were not painted.

Designed at Paddington

The bridge was designed in the Steelwork Office at Paddington to the approval of Mr. M. G. R. Smith, Chief Civil Engineer.

The girderwork, weighing 107 tons, was fabricated by the Fairfield Shipbuilding & Engineering Co. Ltd. of Chepstow, which company also cast the concrete pads on the top flanges of the main girders. The reinforced concrete bedcourse units were cast by the Concrete Development Co. Ltd. at its works at Iver, and this company also carried out the prestressing on site. The reinforced concrete well-deck units were cast in the Taunton Concrete Works of the Western Region, and the erection on site was carried out by railway labour under the direction of Mr. A. W. McMurdo, District Engineer, Wolverhampton, Western Region.

BRITISH RAILWAYS PROTOTYPE RAIL-AND-ROAD WAGON TO BE TESTED.—The prototype of a combined rail-and-road goods vehicle, known as the "roadrailer," is to be tested shortly by British Railways. The vehicle is based on the combined rail-and-road wagon designed by the Chesapeake & Ohio Railway and described in our April 26, 1957, issue. It was designed by the technical staffs of British Railways and the Pressed Steel Co. Ltd., and was built by the latter firm. Outwardly the roadrailer resembles the semi-trailer road vehicle common in Britain. At the trailing end, instead of the normal road wheel assembly, a device retracts the road wheels and lets down a pair of rail wheels. At the leading end a special coupling fits into the trailing end of another, similar trailer. When the vehicles are operated on road, the road wheels are let down and the vehicle is coupled to a road tractor in the usual way. In this form it will collect its load from the consignor and take it to an exchange point by the side of a railway track. At this point the rail wheels are let down and the trailer is then coupled to other trailers to form a complete train.

This is then run as a fast goods train to another exchange point close to the destination, where the road wheels are again let down and the trailer moved by road to its destination. The payload capacity is 11 tons. The first prototype is about to undergo trials on the Motor Industry Research Association test track at Nuneaton, where it will be joined by a second vehicle in a few days' time.

Once the road tests have been completed, the trailers will be tested on rail between Bishops Stortford and Braintree, in the Eastern Region. After the tests have been made and any necessary modifications incorporated, the prototypes will be displayed to potential users throughout Britain.

Remodelling of Railway Facilities at Peterborough

Comprehensive plan at an estimated cost of £5,500,000

MUCH of the layout and many of the facilities at Peterborough, British Railways, Eastern Region, date from the middle and later years of the last century, and are quite unsuited to the demands of a growing town for a modern railway service. The need for improving the passenger station and eliminating the restrictive curves of the main line has been considered for many years and a start was, in fact, made in 1913, but not until now has it been possible to bring together all the problems which require solution.

Comprehensive plans to provide Peterborough with the most up-to-date aggregation of railway installations in the country, at an estimated cost of more than £5,500,000, have been prepared by the Eastern Region. The proposals fall into two main groups ; route modernisation and reconstruction of installations.

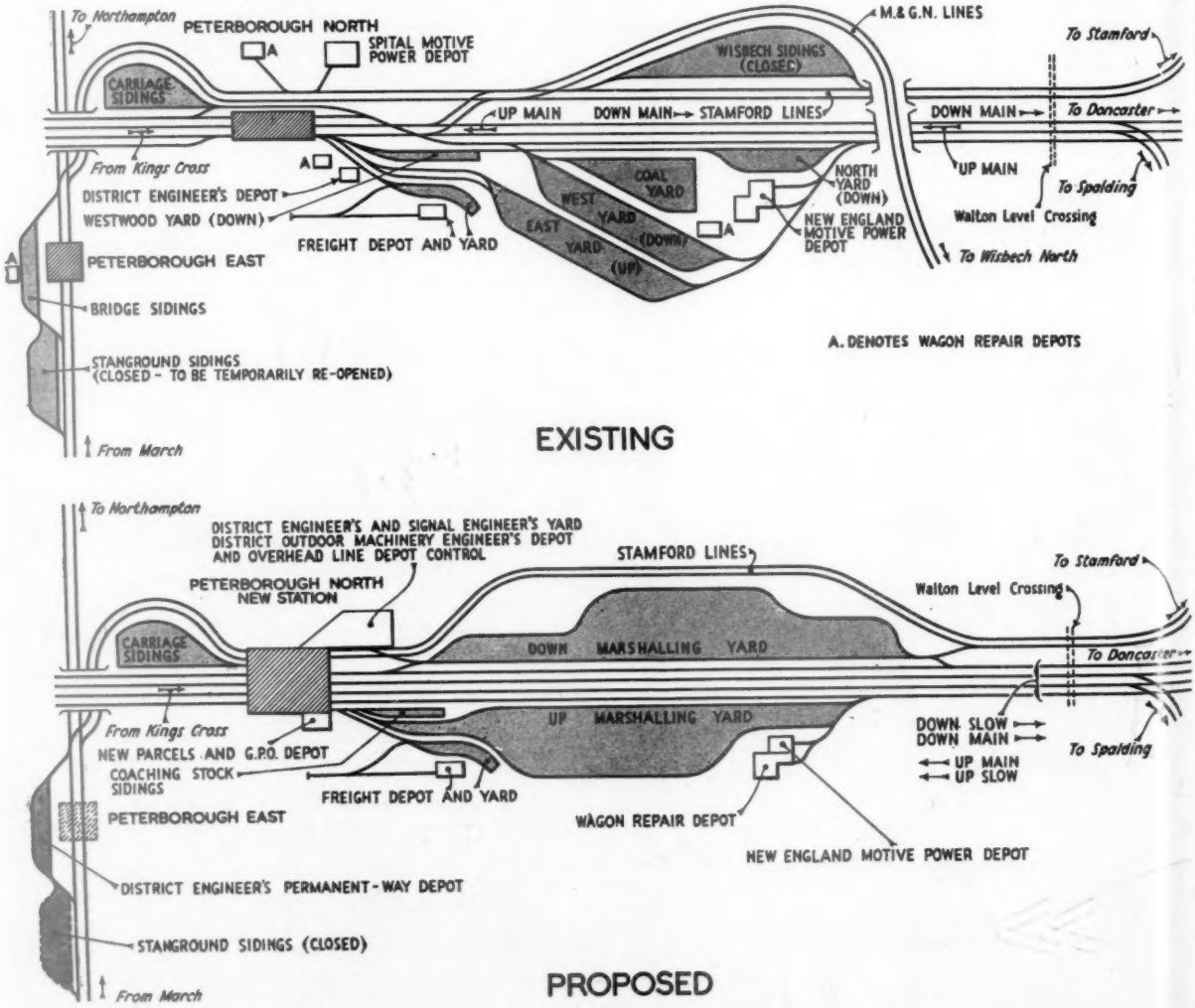
The running facilities from the point at which the lines cross the River Nene to Werrington Junction are inadequate. There is a permanent speed restriction of 20 m.p.h. through the station and all up passenger and freight trains calling at Peterborough have to be routed over one track. To meet future needs it is proposed to re-align the main running lines, abolish the existing reverse curves, and raise the speed limit to 85 m.p.h. Four tracks will be installed between Werrington Junction and Nene sidings for main-line running, re-arranged to provide up lines side by side on the east side and down lines likewise on the west side. Running connections between the former L.M.S.R. Stamford line and the East Coast main line between the Nene bridges and Werrington Junction are to be improved making additional tracks available, in each direction, to both Stamford and main-line trains through the North station and its approaches. Werrington Junction will be remodelled in conformity with the re-arranged track layout.

Improved Platform Capacity

At present, main-line trains can use only three platform faces at Peterborough North, varying in length between 720 and 880 ft. This causes difficulties with the present week-day service and leads to heavy delays at peak periods. In the new layout, it is proposed to provide three island platforms giving six platform faces varying between 1,075 and 1,290 ft. in length. Bay platforms will also be provided.

The new arrangement will enable non-stop expresses to pass through the area without interfering with the movement of stopping trains. It will also provide cross-platform interchange for passengers. A seventh line will service a parcels depot

(*Continued on page* 108)



Existing and proposed layout at Peterborough, British Railways, Eastern Region, showing improved running facilities

Mobile Training Car For Motive Power Staff

Instruction with aid of heavy and light models on Eastern Railway of India

By A. C. Bhattacharya, A.M.I.P.E.
Progress & Planning Superintendent, Kanchrapara Carriage & Wagon Shops, Eastern Railway of India

Lecture room, showing long table on left for miniature railway, and revolving and wall-mounted diagram display stands

TO stimulate interest and promote confidence among the motive power staff, a refresher course, conducted with the help of a mobile training car, has been introduced by the Eastern Railway of India. The vehicle is a former ward car, converted at Kanchrapara Workshops. It is to tour motive power depots. The staff concerned receive theoretical instruction and are given demonstrations in connection with their day to day work.

The training is intended to cover trade training and to help footplate and other technical staff in comprehending the functions and the principles of repair, maintenance, and servicing of locomotives. The instructional facilities available on the car are additional to the normal training given to these grades.

Interior

The coach contains a 28-seat lecture room at one end. At the other end are living facilities for the travelling instructor. The lecture room is equipped with one large and another small stepped-down racks for the display of heavy and light models respectively. There is a stand with revolving arms centrally located near the smaller rack. This stand, with swing rails from side walls, is used for displaying equipment diagrams, drawings, charts, and so on.

On one side of the lecture room, along the side wall, is a table 40 ft. long and 18 in. wide, for a miniature railway, for demonstration of train working and ancillary equipment.

After the lectures on heavy models are over, the trainees face in the opposite direction, by throwing the back-rests of the benches to the other side, to hear the lectures on light models, also instruction with the help of charts and diagrams.

The instructor's living-room is equipped with a cupboard, two folding tables and an upholstered berth. Adjacent to this room is a toilet compartment.

The coach also incorporates a kitchen and a separate lavatory for the use of the attendant. The rooms are accessible through a side corridor 2 ft. wide running from the lecture room. For the attendant to sleep in at night, a folding berth is provided in the lecture room, near the instructor's room.

Demonstration Equipment

The training programme is in four major parts, and equipment is provided accordingly, grouped as follows:—(*a*) mechanical drawings; (*b*) models; (*c*) diagrams and charts; and (*d*) books. To assist driver training, diagrams showing block system, both absolute and automatic, and block instruments with commutator and different types of signals used, are provided.

Drawings include various types and classifications of locomotives in use with wheel arrangements, boiler with integral parts, throttle valves, piston and valve assembly with by-pass valve connections, big end positions illustrating port openings, and so on.

The models displayed include Nathan type injector; solid jet type, Dreadnought and Super Dreadnought ejector; lubricators (a.c. type with condenser and choke valve, Detroit and mechanical

Part of living accommodation for travelling instructor

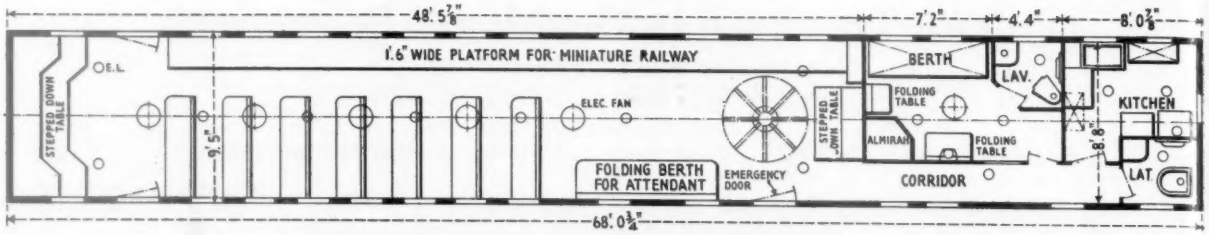


Diagram of general arrangement of mobile training car

type); Henry's non-chatter and Midland type by-pass valves; high-pressure release valve; and anti-vacuum air valve. Besides these there are models of vacuum and steam pressure gauges; element, flue, smoke and arch tubes; and axle auxiliary oil box. Many of these models are sectioned.

Charts and diagrams play an important part in such instructional courses. The syllabus not only covers the technical aspect of the work of the staff but is also designed to give them a general insight into the whole field of railway working. The charts provided include ruling gradients, different types of valve gear, pressure and temperature, and diagrams of vacuum and steam brake connections. To stimulate interest in acquiring a thorough knowledge of such matters, complete sets of books of general and subsidiary rules, and block working manuals, fuel manuals, and safety first instructions are also available to all students.

The various grades of staff are to be given short courses of lectures and demonstrations. The numbers in each instance are limited to facilitate individual attention and encourage questions.

Remodelling Railway Facilities at Peterborough

(*Concluded from page* 106)

and a postal sorting office, thus separating parcels and mails traffics from passenger movements, which will greatly facilitate the working and improve the comfort and convenience of the travelling public.

The whole of the lines between the Nene bridges and Werrington Junction will be re-signalled as part of the route modernisation. It is intended that all main-line movements between Werrington Junction and Fletton, just over a mile south of Peterborough, will be controlled from one box near the new station.

Reconstruction of Installations

All passenger trains serving Peterborough will use the new North station and through trains between East Anglia and the Midlands will be re-routed via Seaton Junction and Stamford. It is proposed to reconstruct the station buildings at the North station mainly in the form of a wide overbridge, spanning the tracks and platforms. In the existing station, waiting rooms and refreshment rooms are provided on individual platforms. Concentration of these buildings on a wide overbridge will enable facilities of a high standard to be planned in a convenient location.

A modern parcels office and separate parcels platform with subways connecting them to the passenger platforms will be built. The parcels platform and subways will be linked with a new postal sorting office which the G.P.O. proposes to build adjacent to the parcels depot.

Marshalling Yards

The present method of sorting wagons in the numerous small existing yards is expensive in signalling, locomotive power, and shunting staff, and the amount of inter-yard transfer delays goods in transit. At present, all down freight trains calling at Peterborough have to cross the up line to enter the marshalling yard and to cross the up line again when leaving. This leads to interruptions which will not be tolerable when more frequent express services are running. It is, therefore, necessary to construct a new marshalling yard on the down side and to remodel the straggling collection of yards on the up side into one new up yard.

Arrival and departure of trains in the new yards will be controlled from the new signalbox. To provide a compact down yard, it is proposed to sever the Peterborough end of the former M. & G.N. line at a point west of Dogsthorpe and to remove the existing flyover over the East Coast main line. By providing a new curve at Murrow, the remaining length of the M. & G.N. line, which is only used for local freight traffic, can be connected to the line from Lincoln to March and be better served from Whitemoor marshalling yard.

Engineering Maintenance Depots

The present sites of the District Engineer's workshops are required for the northern end of the new North station buildings, the parcels depot and the postal sorting office. The new plans provide for the construction of a combined workshop and stores for the District Engineer, Area Signal Engineer, and the Outdoor Machinery Engineer's staff, on the site of Spital Motive Power Depot, which will be closed, and a permanent way depot on the site of Bridge sidings at Peterborough East.

The carriage and wagon repair work is now carried out at four different locations, and the long-term plan is to rationalise this work in a workshop which will occupy part of the site of the existing motive power depot at New England. This will not be possible until steam traction is withdrawn, and temporary arrangements will be made during the interim period to deal with repair work now done at the Peterborough North and Peterborough East workshops, both of which require to be removed for the reconstruction work.

The plans will thus provide modern and compact engineering maintenance facilities. On the Spital site, there will be adequate storage space and sufficient room will be available for an overhead line maintenance depot and control room to be constructed in connection with the ultimate electrification of the Great Northern main line. The permanent way depot at Bridge sidings will be mainly for storage of materials and the prefabrication of track components.

SERVICE DEPOT FOR YALE INDUSTRIAL TRUCKS.—A new service depot for London and the Home Counties has been opened at Ripple Road, Barking, Essex, by the British Materials Handling Division of The Yale & Towne Manufacturing Company. It is well equipped and is staffed by Yale fitters specially trained for carrying out routine servicing and component repairs. The telephone number is Dominion 5945.

OVERHEAD EQUIPMENT FOR POLISH STATE RAILWAYS ELECTRIFICATION.—The first items under a £2,750,000 railway electrification contract awarded through the Polish Government agency, Elektrim, have been despatched by British Insulated Callender's Construction Co. Ltd., one of the three British manufacturers who are parties to the agreement. The consignment left the B.I.C.C. Prescot Works by rail on December 13, for Hull and was shipped in the Polish motor vessel, *Lech*. It consisted of 83 drums of 100-sq. mm. grooved-copper trolley wire (roughly 100 *tonnes* net), 29 drums of 107-sq. mm. grooved cadmium-copper trolley wire (40 *tonnes*), and 15 drums of 19-strand hard-drawn bare cadmium-copper wire (30 *tonnes*). A second consignment of 200 *tonnes* of 100-sq. mm. grooved-copper trolley wire was shipped from Hull on December 24. The remainder of the B.I.C.C. commitment under the contract, consisting entirely of this grade of wire, is expected to be delivered at the rate of 100 tons a month over the next 18 months.

RAILWAY NEWS SECTION

PERSONAL

Mr. B. B. Mathur, General Manager, Northern Railway, India, has been appointed General Manager of the Western Railway. He succeeds Mr. S. G. Pothan.

Mr. J. J. Finlayson, M.I.Mech.E., M.I.Loco.E., Mechanical Engineer (General), British Railways Central Staff, who, as recorded in our January 8 issue, has been appointed Chief Mechanical & Electrical Engineer, Scottish Region, British Railways, was educated at Allen Glen's School and the Royal Technical College, Glasgow. Following an apprenticeship, from 1918 to 1923, with the North British Locomotive Co. Ltd., he entered the service of the London & North Eastern Railway in the Chief Mechanical Engineer's Department at Cowlairs Works. After a period in the Drawing Office he held various appointments, and, in 1934, became Assistant to the Works Manager (Plant & Road Motors). Three years later Mr. Finlayson was appointed Assistant to the Works Manager (Carriage & Wagon) and in 1942, became Assistant to the Works Manager (Locomotives), Cowlairs. Three years later he was Acting Assistant District Locomotive Running Superintendent, Western District, Scotland, returning to Cowlairs the following year as Assistant Works Manager. In March, 1947, he was appointed Locomotive Works Manager at Gorton, and Works Manager (Locomotives Outdoor Machinery & Electrical), Swindon, in January, 1952. Mr. Finlayson was appointed Assistant Mechanical & Electrical Engineer, Derby Headquarters, London Midland Region, British Railways in 1956, and in 1959 took up the position he now vacates. His present appointment is part of the re-organisation of the Scottish Region which combines, under one officer, the Mechanical & Electrical Engineering Department and the Carriage & Wagon Department.

Mr. Charles M. Cock, who recently retired as General Manager, Traction Department, English Electric Co. Ltd., has been elected to the board of Dowsett Holdings Limited.

Mr. L. W. Page, Assistant Engineer, Eastern Counties Omnibus Co. Ltd., has been appointed Chief Engineer.

Mr. H. N. Edwards, Managing Director, Metropolitan-Cammell Carriage & Wagon Co. Ltd., having reached the normal retiring age, will relinquish that appointment on January 31, but will remain Chairman of the Board of Directors. Mr. D. J. C. Robertson, at present General Manager of the company, will succeed Mr. Edwards as Managing Director.

Mr. E. H. Poulton, Secretary of the Stores Board, Victorian Railways, since 1950, has retired. He is succeeded by Mr. E. E. Curtis, Officer-in-Charge of the Workers' Compensation Section. Mr. Poulton was also the Commissioners' Representative on the Stores Standardisation Committee and a Member of the Tender Board. He had completed 48 years of railway service.

Sir Brian Robertson, Chairman of the British Transport Commission, has been invested as Commander (Brother) in the Order of St. John, by Lord Wakehurst, Lord Prior of the Order. Colonel N. McKay Jesper, Chief Police Officer, B.T.C., 1956-58, was invested as Serving Brother of the Order.

Mr. J. Roy Rewell, Assistant Chief Traffic Manager, Victorian Railways, who, as recorded in our December 4 issue, has been appointed Chief Traffic Manager, joined the Department in 1915 as a junior clerk. After experience in country station work he was transferred, in 1918, to the then Train-Running Room (now Train Control) at Head Office, Melbourne. Subsequently, he joined the staff of the Outdoor Superintendent and, several years later, was appointed Secretary to the late Mr. R. G. Wishart, a Victorian Railways Commissioner. He held this position for seven years, before returning to the Traffic Branch, in 1950, as Outdoor Superintendent. Mr. Rewell went abroad in 1953 to make a special study of modern railway developments. Particular attention was paid to the handling of suburban electric traffic in American and England. He also studied centralised traffic control, and this was subsequently introduced on a section of the Melbourne suburban electrified system. Mr. Rewell had been Assistant Chief Traffic Manager for the past three years.

Mr. F. H. Hodgson, Boiler Engineer, Mechanical Branch, New South Wales Government Railways, has retired after 44 years of railway service.

Mr. J. J. Finlayson
Appointed Chief Mechanical & Electrical Engineer, Scottish Region

Mr. J. R. Rewell
Appointed Chief Traffic Manager, Victorian Railways

The late Mr. F. C. Hockridge
Surveyor & Estate Agent, G.W.R., and Western Region, 1942-51

The late Mr. A. Berriman
Head of Press Advertising Section, Southern Railway and Southern Region, 1925-53

Mr. A. I. Emerson
Appointed District Engineer, Cambridge, Eastern Region

We regret to record the death on January 10, at the age of 72, of Mr. F. C. Hockridge, Surveyor & Estate Agent, Great Western Railway, from 1942 to 1951. Mr. Hockridge began his career in the Secretary's Office of the Taff Vale Railway, and remained with that company until the passing of the Railways Act in 1921. He was retained at Cardiff in connection with the winding-up of the South Wales Railways until 1924, when he transferred to Paddington and became responsible for estate and kindred matters in the Secretary's Office. In 1926 he was appointed Secretary of the Fishguard & Rosslare Railways & Harbours Co. Ltd., and held that position until 1929, when he became Assistant to the Surveyor. He was promoted to the post of Assistant Surveyor & Estate Agent in 1931, and became Deputy Surveyor & Estate Agent in 1941. Mr. Hockridge succeeded the late Mr. F. W. Showers as Surveyor & Estate Agent, G.W.R., in 1942, and, on nationalisation of the railways, continued in that capacity with the Western Region of British Railways. In addition to his Fellowship of the Royal Institution of Chartered Surveyors and membership of the Rating Surveyors' Association, Mr. Hockridge was a Fellow of the Chartered Institute of Secretaries and the Association of Certified & Corporate Accountants for 32 years. He was a Past-Chairman of the Great Western (London) Housing Association Limited and of the Committee of Management of that Association. For some years he was a Director of the Welsh Town-Planning & Housing Trust Limited. Mr. Hockridge retired on January 1, 1951. Cremation took place at Mortlake Crematorium on Thursday, last week.

Mr. Stewart D. H. Thomas, Senior Methods Analyst, Methods Division, Revenue Accounting, Montreal, Canadian National Railways, has been appointed Methods Supervisor, Revenue Accounting. Mr. Reginald H. Barnard, Personnel Assistant, Revenue Accounting, has been appointed Administrative Assistant, Personnel, in the Accounting & Finance Department.

Dipl.-Ing. Walter Völker, Head of the Operating Department, Deutsche Bundesbhan Divisional Management, Essen, has been appointed President of the Bundesbahndirektion, Hanover. He succeeds Mr. H. Wegner, who has retired.

We regret to record the death on January 14, at the age of 66, of Mr. A. Berriman, Head of the Press Advertising Section, Southern Railway and Southern Region, British Railways, from 1925 to 1953. Mr. Berriman was educated at Andover Grammar School and joined the London & South Western Railway in March, 1911, after earlier training in accountancy. He spent a year at Andover Junction gaining booking office and general railway experience, and, in March, 1912, moved to the Superintendent of the Line's Office at Waterloo Station. When the first Advertising Department was formed, Mr. Berriman was one of the original members and, in 1913, was transferred to the General Manager's Office when the first Publicity & Continental Department was formed under the then General Manager, Sir Herbert Walker. During the 1914-18 war, Mr. Berriman served in France from 1915 to 1919 with the Railway Section, Royal Engineers. He returned to the Publicity Department after the war and, when the Southern Railway group was formed in 1923, he continued in that department until the nationalisation of the railways in 1948, when the Southern Region Publicity Department was set up. He retired in August, 1953. Mr. Berriman served on many committees connected with publicity, advertising, docks, hotels, cheap tickets and excursions, Continental services, railway air services, and so on. During the 1939-45 war he served with the Railway Executive Publicity Committee. He became Secretary of the newly-formed Southern Railway Sports Club at Raynes Park in 1923, and continued this work until forced by ill-health to relinquish it in 1942. Mr. Berriman was well known as a writer of light verse on railway topics, much of which has appeared in this journal. The funeral service took place at Ringwood Methodist Church on January 19, followed by interment at Stockbridge.

Mr. F. Vernon Weller, Works Engineer, Klaxon Limited, was awarded the M.B.E. in the New Year's Honours List.

Mr. J. Stacey, Acting Assistant Store Superintendent, Eastern & North Eastern Regions, British Railways, has been appointed Supplies Officer in the Department of the Supplies & Contracts Manager, Eastern Region, and not Supplies & Contracts Manager as incorrectly stated last week.

Mr. A. I. Emerson, B.Sc., A.M.I.C.E., Assistant (Permanent Way) in the office of the Chief Civil Engineer, North Eastern Region, York, who, as recorded in our December 18 issue, has been appointed District Engineer, Cambridge, Eastern Region, is 46. Mr. Emerson began his railway service in 1934, as an engineering graduate with the Civil Engineer, Scottish Area, L.N.E.R. Four years later, after experience in the Southern Area, he became a draughtsman in the permanent way drawing office, Kings Cross. In 1941 he was appointed Assistant Resident Engineer at the Ministry of Supply Factory, Dukinfield, on its conversion to munitions work. From 1942 to 1949 Mr. Emerson held a number of civil engineering positions at Kings Cross, before being appointed to the District Engineer's office, Peterborough. There he was concerned with the preparation and execution of contracts for ballasting, drainage and blanketing on the East Coast Main Line. In 1950 he returned to Kings Cross as Chief Technical Assistant (Permanent Way) and three years later became Assistant District Engineer, York. In 1955 Mr. Emerson was appointed Assistant (Permanent Way) in the Chief Civil Engineer's office, North Eastern Region, York. He has been directly concerned with the preparation and planning of civil engineering work in connection with electrification schemes.

Mr. T. R. Barron has been appointed Movement Assistant to the Line Traffic Manager (Great Eastern), Eastern Region, British Railways. He was formerly Traffic Costing Officer, Cambridge.

Mr. R. J. Liddiard has been appointed Public Relations Officer, Canadian National Railways European Organisation, London. He succeeds Mr. E. F. Humphries who has resigned.

Dr. J. Sharp Grant, Medical Officer, Eastern Region, British Railways, has been appointed Chairman of an independent commission which is to inquire into the Rhodesia Railway Medical Fund. He will leave by air for Rhodesia on January 29. The other members of the commission are Mr. A. J. L. Lewis, a chartered accountant in public practice, and Mr. A. G. Easton, a special representative on the Railway Medical Fund Advisory Board. The inquiry will probably take five or six weeks.

Mr. A. R. Milne
European Commissioner for Colonisation, C.N.R., 1952-59

Mr. M. Bowley
Appointed European Commissioner for Colonisation, C.N.R.

Mr. G. B. Cartmel
Appointed Superintendent of British Emigration, C.N.R.

Mr. A. R. Milne, European Commissioner for Colonisation, Canadian National Railways, who, as, recorded in our October 16 issue, has retired, was born in 1894. Mr. Milne joined the C.N.R. in 1926, and was appointed Assistant to Colonisation Superintendent in November that year. He became Colonisation Superintendent in April, 1930, and European Commissioner of Colonisation in January, 1952.

Mr. Keith H. Kingsley and Mr. George A. Kozloff have been appointed Directors of Chrysler Motors Limited, and Dodge Brothers (Britain) Limited.

Dr. R. C. G. Williams, Chief Engineer of Philips Electrical Limited has been appointed to the board of the newly-created College of Technologists. Brief reference to the College is made elsewhere in this issue.

Mr. F. H. Clark retired from the position of Royal Train Guard, Great Eastern Line, Eastern Region, British Railways, on January 11, after nearly 51 years' railway service. Mr. Clark began his railway career on the former Great Eastern Railway in 1909. He became Deputy Royal Train Guard in 1941 and Royal Train Guard in 1946.

Mr. T. R. Middleton has been appointed a Director of English Steel Corporation Limited and Director of Research with effect from February 1. Dr. H. H. Burton retires from the board on January 31, but he will continue as Research Consultant to the group until December 31.

Mr. L. G. Bing, an Assistant to the Supplies Officer, British Road Services, retires as at March 4. Mr. Bing joined the Stores Department, Great Western Railway, at Swindon, after service in the 1914-18 war. In 1939 he was called up with the Supplementary Reserve, and later became Deputy Assistant Director, Transportation (Stores), R.E., G.H.Q. Middle East, with the rank of Major. On demobilisation, Mr. Bing was seconded by the G.W.R. to the Foreign Office, and became Chief Control Officer (Railway Stores) in the British Zone of Germany. In 1950 he joined British Road Services at Bristol, later becoming Stores Instructor at the Staff College. In 1953, he was transferred to B.R.S. Headquarters, Marylebone.

Mr. M. Bowley, Superintendent of British Emigration, Canadian National Railways, who, as recorded in our October 16 issue, has been appointed European Commissioner for Colonisation was born at Maidstone, Kent. He emigrated to Canada, in 1925, and spent two years on a Manitoba farm, before joining Colonisation & Agriculture Department, C.N.R., in Montreal. Following a move to the Toronto office, in 1933, he was transferred to England, six years later, and worked as Special Representative in London. He was appointed Superintendent of British Emigration in January, 1948. In his new appointment Mr. Bowley will have jurisdiction throughout the United Kingdom, Eire and the Continent.

INSTITUTION OF RAILWAY SIGNAL ENGINEERS

The following names have been entered on, or transferred in, the register of the Institution of Railway Signal Engineers :—

Associate Members :

Mr. B. C. R. Brinkler, Section Engineer, Westinghouse Brake & Signal Co. Ltd., Chippenham.

Mr. J. Busby, Technical Assistant, Signal Engineer's Department, London, Eastern Region, British Railways.

Mr. R. Denton, Electrical Engineer, Westinghouse Brake & Signal Co. Ltd., Chippenham.

Mr. J. Rose, Technical Assistant, Westinghouse Brake & Signal Co. Ltd., Chippenham.

Mr. G. T. Todhunter, Technical Assistant, Westinghouse Brake & Signal Co. Ltd., Chippenham.

Transfer from Student to Associate Member :

Mr. I. M. Page, Engineering Assistant, Signal Engineering Department, Reading, Western Region, British Railways.

Mr. M. Rendall, Engineering Assistant, Signal Engineering Department, Reading, Western Region, British Railways.

Mr. L. S. Lawrence, Technical Assistant, Signal Engineer's Office, London Transport Executive.

Transfer from Student to Graduate

Mr. D. A. Hotchkiss, Post-Graduate Apprentice, Westinghouse Brake & Signal Co. Ltd., Chippenham.

Mr. R. A. H. Methuen, Graduate Apprentice, Westinghouse Brake & Signal Co. Ltd.

Graduate

Mr. W. D. Newby, Technical Assistant, Signal Engineer's Office, London Transport Executive.

Mr. G. B. Cartmel, Assistant Superintendent of Emigration, Canadian National Railways, who, as recorded in our October 16 issue, has been appointed Superintendent of British Emigration, was born at Fredericton, New Brunswick, in 1910. He joined the C.N.R., in London, eight years ago as Assistant to Superintendent of British Emigration. He served, in a similar capacity, on the Continental side from 1952, from which position he received his present promotion to be Superintendent of British Emigration.

Mr. R. G. Kenwright has joined Plessey Co. Ltd., as Chief Engineer, Television Components Division, Components Group, Ilford.

Mr. S. Black, Head of the Publicity Department, British Electrical & Allied Manufacturers' Association, has resigned to take a new position in publishing.

Mr. Grenville Naylor has joined the board of the British Overseas Engineering & Construction Corporation, one of the Taylor Woodrow group of building & civil engineering companies.

Mr. B. J. West has been appointed Secretary of Stone-Platt Industries Limited. He succeeds Mr. H. T. Loveland, who has retired from the position and also from the board of Platt Brothers & Co. Ltd.

Mr. K. S. Peacock has relinquished his position as Joint Managing Director of Guest Keen & Nettlefolds (South Wales) Limited, but remains Chairman. Mr. N. R. R. Brooke, formerly a Joint Managing Director, has been appointed sole Managing Director.

Mr. E. T. Judge, who was appointed Assistant Manager Director, Dorman Long (Steel) Limited, a year ago, was appointed Joint Managing Director. He also becomes an Executive Director of the parent company, Dorman Long & Co. Ltd.

Mr. A. E. Gregg has been appointed a Director & General Manager of Crompton Parkinson (Chelmsford) Limited. Mr. A. V. Sowman, Managing Director, remains in that capacity. Mr. Gregg has been with the Crompton Parkinson Group since 1936, and for the past year has been General Manager, Guiseley Works.

NEW EQUIPMENT AND PROCESSES

Heavy-duty Side Operating Fork-lifts

NOW a practical financial proposition as a result of the easing of international currency restrictions, the Otis "Traveloader" range of heavy-duty side-operating fork-lift transporters, diesel-, petrol-, and battery-operated, are designed to handle long, heavy, bulky loads in confined spaces. Self-loading and unloading, the machines operate like orthodox fork-lift trucks, carry their loads over all four wheels like platform trucks, and deliver their loads like conventional road vehicles and at similar speeds.

Experience has shown they can be used as substitutes for, or to augment the operations of, overhead gantry cranes. It is for this reason that the British licensees intend to concentrate mainly on units of 20,000, 30,000 and 50,000 lb. capacities.

Further details can be obtained from the British Licensees, Materials Handling Equipment (Great Britain) Limited, 40a, Dover Street, London, W.1.

Automatically-controlled Bulldozer

AN entirely new approach to the problems of control and wheel adhesion encountered when wheel tractors are used for earthmoving has been made with the new "Sapper" Reardozer for use with Massey-Ferguson tractors.

Carried by the normal three-point linkage, this implement takes full advantage of the Massey-Ferguson draught control system. Its reversing mechanism enables it to respond to thrust in exactly the same way as, for instance, the Ferguson Plough. Its weight, therefore, is automatically transferred between cutting edge and rear axle; giving maximum wheel adhesion and penetration. The operating linkage gives a closely-controlled floating action, and this, with instant response by the hydraulic system to variations in blade loading, means that a higher operating speed can be maintained with consequent saving in time and tyre wear.

Optional extras are a scarifying grid and a reversed control outfit, which comprises a rearward facing seat pillar bolting to the central mounting pad, and provision for bringing brake, hydraulic and ancillary controls within easy reach. This attachment provides full control and visibility with comfort and complete safety.

Further details can be obtained from the manufacturer, Bomford & Evershed Limited, Salford Priors, Evesham, Worcs.

Viscosity Comparator for Diesel Maintenance

THE C.D. Viscosity Comparator is a pocket-size instrument intended primarily for the use of lubrication and diesel engineers to enable tests of lubricating oil to be made quickly and accurately, so reducing expensive maintenance. It is a tool for preventative maintenance by the smaller engine user to enable routine tests for deterioration of oil samples by oxidisation, polymerisation, dilution by unburnt fuel, and contamination by products of incomplete combustion, to be made by means of comparing the viscosity with that of a reference oil of known characteristics.

The comparator is basically a pair of rolling-sphere viscometers built as a single unit. One of the tube assemblies is used as a reference and is filled with certified oil. The scale is calibrated with respect to the reference tube at 70° F. When the instrument is used at, or near to, this temperature it will give direct viscosity readings; simple correction data is supplied for use at other temperatures. The carefully-matched and calibrated precision glass tubes are mounted parallel to each other in a rigid frame and supplied complete in a polished hardwood glass-panelled case with a fitted thermometer. The test-oil tube contains a stainless-steel ball and has a nozzle and plunger to permit easy filling. The reference tube contains an identical ball; it is sealed and fitted with an expansion gland. The case is used to allow the comparator to attain a stable temperature prior to taking readings.

To carry out a test, after filling the test-oil tube both the spheres are brought to the nozzle end by tilting the instrument. It is then tilted the other way causing the spheres to roll through the oils. As the leading sphere approaches the full scale mark the instrument is gently brought to a horizontal position so that the sphere comes to rest at this mark. The position of the other then indicates on the scale the viscosity of the oil being tested. The instruction book supplied includes notes on routine testing and viscosity/dilution data.

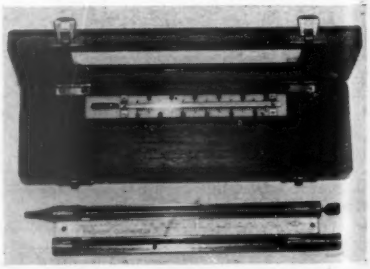
Further details including price and delivery may be obtained from Control Developments Limited, 30 Gloucester Street, Gorton, Manchester, 18.

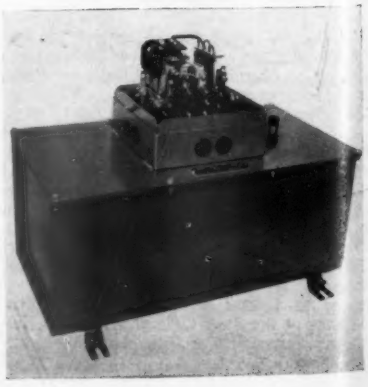
Heavy-duty Vapormatic Starter

THE C1 and C2 heavy-duty Vapormatic starters for slip-ring motors incorporate all the features of the standard Vapormatic rotor starter introduced to the United Kingdom in 1958 by Lee Guinness Limited and which has been used successfully in a large number of applications, including steel and cement manufacture and machine-tool drives. It is intended to meet the demand for a unit with the same characteristics of automatic current-controlled stepless starting, low initial and maintenance costs, and space-saving compared with a normal rotor starter, with the additional advantage of being suitable for more frequent use.

The action of the apparatus is based on the great difference in resistance of a liquid electrolyte compared with its vapour. The means of harnessing this principle for use in starters was described in our December 25 issue concerning the Lee Guinness Startomatic unit designed for squirrel-cage motors. A contactor integral with the apparatus short circuits the Vapormatic unit when the load has dropped to normal; this operates under time control related to the starting period.

The C1 unit, for motors of 40-80 h.p., is suitable for three times the number of starts per hr. and six times the number of consecutive starts listed for a standard unit. The C2, for up to 40 h.p., can give one and a





half times the number of starts per hr., and three times the number of consecutive starts listed for two standard Vapormatic units connected in parallel. Prices range from £37 10s. to £77 10s., and delivery is from stock.

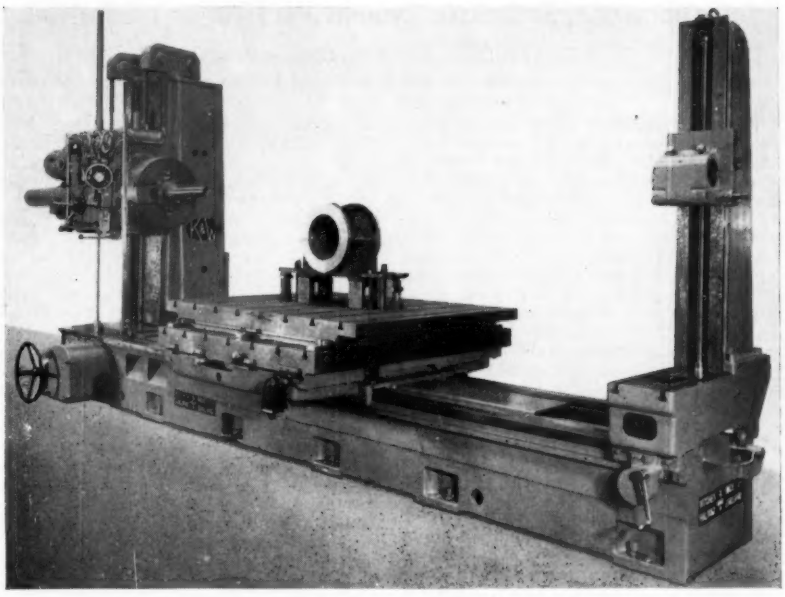
Further particulars may be obtained from Lee Guinness Limited, Newtownards, Northern Ireland.

Horizontal Borer

THE H 15 horizontal borer has become a standard machine in the productions range of Kitchen & Wade Limited. It is a versatile unit capable of horizontal drilling, boring, tapping, facing, and milling. The main drive from the constant-speed 10-h.p. motor mounted on the upper portion of the head is taken through multiple-plate friction clutches to the gearbox, which gives a range of 64 speeds, from 900 to 3 r.p.m. The spindle diameter is 3½ in. and it is bored No. 5 Morse taper.

There are 32 changes of speed to the 2 ft.-dia. facing head, covering a range from 180 to 3 r.p.m. There is a dual range of feeds to the spindle horizontal motion, facing slide, cross feed, head vertical motion, and longitudinal and transverse traverses of the table, as well as to the vertical motion of the boring stay bearing bracket. The head on the standard machine has 3 ft. of vertical motion. The spindle has a total traverse of 4 ft. obtained in two settings. All speed and feed gears are contained in the head and lubricated by built-in oil pump. Changes of speed and feed are obtained by hydraulic gear change; two controls only are required for the 64 speed changes and one for the full range of feed changes. The head is balanced by dead weight in the interior of the box-section column.

The compound table of the H 15 machine consists of a revolving table, 3 ft. 6 in. square, and 6 in. deep, spigotted to the main table and with four definite 90-deg. stops; a main table 5 ft. × 3 ft. in which a jacking device breaks the joint of the revolving table allowing it to revolve freely on ball bearings; and a bottom table slide which fits directly on the machine bed and has 4-ft. 9-in. horizontal motion between the facing slide and boring stay. The one-piece casting of the main bed houses a separately motor-driven gearbox to give rapid traverse to the head vertical motion, table longitudinal and transverse motions, and boring bar steady. Standard equipment includes Verniers to the head and steady vertical motions and to the table transverse motions. Further particulars, including price and delivery, are obtainable from Drummond-Asquith Limited, P.O. Box 137, Birmingham.



Sound-Level Meter

THE 1400E Sound-Level Meter measures sound level and determines the exact nature of a given noise. It is claimed to be the first commercial fully-transistorised unit of its type, and has been designed with the transport industry particularly in mind. By the replacement of all electronic valves with transistors powered by built-in dry batteries the instrument has been made fully self-contained with an overall size of only 8¼ x 5¾ x 3¾ in. and a weight of less than 4 lb. It can be operated readily with one hand while the other is used to record the readings. The use of transistors also leads to stability under the widest possible range of operating conditions, and the proposed specification of the International Electrotechnical Commission, has been met.

The meter is switched on automatically when the microphone is raised to working position from a recess in the top of the case, and no warming-up period is required before readings can be taken. One set of batteries provides an operating period of 60 hr. A power unit can be supplied for mains operation in laboratories. A variable attenuator gives a direct reading of sound level over the range from 24 to 140 dB. The standard meter therefore covers the range for virtually every industrial application. A further feature is the inclusion of weighting networks to simulate the frequency response of the human ear.

Typical applications include the checking of noise levels in passenger compartments, and the inspection of gear transmissions for operating smoothness.

Further details may be obtained from the manufacturer, Dawe Instruments Limited, 99, Uxbridge Road, London, W.5.

Bulk Nylon for Industrial Use

LARGE symmetrical nylon shapes weighing up to 400 lb. have been produced by the Polymer Corporation, Reading, Pennsylvania, U.S.A., parent company of Polypenco Limited. Claimed to be the largest ever produced, these sections are the result of a new technique and are being made available in limited quantities for evaluation purposes. They will shortly be supplied on a production basis and will be fabricated by Polypenco Limited in the very near future.

The Polymer Corporation has produced nylon shapes up to 36 in. width × 2⅜ in. thickness in 102 in. lengths. In the metal-working and manufacturing fields such large sizes suggest applications for tooling fixtures, wear plates, large rollers, and so on, where the inherent corrosion-resistance, resilience, and mechanical surface characteristics of nylon may be desired and where non-ferrous metals and stainless steel are the traditional materials.

Further details may be obtained from Polypenco Limited, 68-70 Tewin Road, Welwyn Garden City, Herts.

Cold-Starting Oil

DEVELOPED from Shell Rotella, Shell Rotella Multigrade oil is claimed to provide a considerable reserve of lubrication safety at high operating temperatures and greater fluidity at cold starting temperatures.

The new oil's chief advantage is a general reduction of fluid friction in the engine with consequent fuel economies. These have been attested by road tests carried out over a year by the manufacturer and by users.

Further details can be obtained from Shell-Mex & B.P. Limited, Shell-Mex House, Strand, London, W.C.2.

Radiator Valve

IT is often found that the screw-down valve controlling a hot-water radiator produces full heat output in a fraction of the first turn, so that it behaves as little more than an on-off control. This is because, although the hot water flow may be proportional to the opening of the valve, the heat output rises more rapidly.

The T.A. radiator valve, by providing non-linear control of water flow, is claimed to give a heat control proportional to valve setting. The valve is intended for forced circulation systems, and produces non-linear flow control through a tulip-shaped cone.

Further details may be obtained from Harford Pumps Limited, 12-14, Whitfield Street, London, W.1.

Associated Electrical Industries (Rugby) Limited

Substantial orders during the past year for railways at home and overseas

The reorganisation of Associated Electrical Industries Limited on a product basis, which began last year with the formation of the Turbine-Generator and Heavy Plant Divisions, was carried a stage further on July 1, 1959, when five new divisions, Electronic Apparatus, Motor & Control Gear, Switchgear, Traction, and Transformer, came into operation. On January 1, 1960, the complete reorganisation was concluded by the formation of three Management Companies: A.E.I. (Manchester) Limited, formerly Metropolitan-Vickers Electrical Co. Ltd.; A.E.I. (Rugby) Limited, formerly British Thomson-Houston Co. Ltd.; and A.E.I. (Woolwich) Limited, formerly Siemens Edison Swan Limited.

Power Rectifiers

The past year has shown a marked increase in the number of projects which involve rectifier apparatus, and among the more notable orders received by A.E.I. (Rugby) Limited, is one from the Victorian Railways for ten 1,500-kW., 1,500-V. pumpless mercury-arc rectifier equipments for railway service. These will be generally similar to the 39 equipments supplied to this customer in 1952 but, in line with present practice, the rectifier tanks will be truck-mounted and housed in fixed cubicles. The transformers for this order will be built in Australia by Australian Electrical Industries (Pty) Limited, to designs prepared by the A.E.I. Transformer Division at Rugby.

A larger order, for both mercury-arc and semi-conductor rectifiers, has resulted from the British Transport Commission decision to electrify the Manchester-Crewe line, British Railways, London Midland Region, and, ultimately, the whole route from Manchester to Euston. The first of the new a.c. locomotives for this service was handed-over by A.E.I. at the end of November. The locomotives will operate at 25 kV., and 25 of them will be equipped with mercury-arc rectifiers. Semi-conductor rectifiers will be installed in 40 other locomotives. In the first locomotives, the installation will consist of three air-cooled, six-anode, pumpless steel-tank mercury-arc rectifiers diametrically connected in parallel, so that each tank has three anodes in each half-cycle. Load-sharing reactors share the current between the tanks and individual anodes. The full-load one-hr. rating of these rectifiers is 937 V., 933 A. for each tank. The semi-conductor rectifiers will be rated at 975 V., 2,800 A.

Good progress has been made with other large orders for rectifiers in hand for the British Transport Commission. A number of the single-anode mercury-arc type are already in service on the Glasgow-Cathcart circle line, British Railways, Scottish Region, and the first of the multi-anode tanks have been delivered and installed. The germanium rectifiers for underframe mounting on motor coaches have all been despatched, and installation in the coaches is proceeding.

Control Gear

The first phase of the Kent Coast extension of electrification on British Railways, Southern Region, was opened for public service on June 15, 1959. A.E.I. supplied, erected, and commissioned 81 truck mounted high-speed circuit-breakers for the section of line between Faversham and Dover, involving eight substations and eight track-paralleling huts. The high-speed circuit-breakers supplied were standard truck-mounted Type "RJR 721" units and these are used throughout for track feeders. Nine Type "RLR 151" breakers for rectifier feeders were also supplied. The latter are the new 5,000-A. latch-type breakers which have proved extremely satisfactory in service.

Ten 700-A. regenerative loading equipments are being supplied for the South African Railways. The equipments are for use in substations along the Natal section of S.A.R. where the steep gradients make regenerative braking desirable. The energy put back into the overhead conductor by a descending train using regenerative braking may cause a rise in voltage which would damage the traction motors unless there was another train climbing the bank. Each loading equipment, therefore, comprises an open-type panel with seven h.t. contactor-ignitron sections together with a master control cubicle with seven detector and control sections. The master control cubicle will, on rise of conductor voltage, switch on as many sections of resistance as are required to reduce the voltage to a safe level. After the voltage has dropped to normal for a pre-determined short period of time, the resistance units will be progressively switched out of circuit.

An order also received during the year was for a further 17 Type "RJR" high-speed, circuit-breakers for track feeders, also for South African Railways. This increases the orders for high-speed circuit-breakers for South African Railways since 1956 to a total of 732.

Sixty-six high-speed circuit-breakers have been supplied for the Gosford electrification scheme on New South Wales Government Railways. These breakers are of the truck-mounted Type "RJR 712," and are being used for track feeders, sectioning breakers, and rectifier duties.

Ignitron Loading Equipments

An order was received from the South African Railways for 73 ignitron loading equipments. These are being developed in conjunction with the Motor & Control Gear Division, who will supply the remainder of the control equipment. The high voltage necessitated the development of a new ignitron for this service; further, as the customer specified that thyratron firing of the ignitron was not to be used, a special circuit involving a cold-cathode trigger tube has been developed. Extended life tests were made to ensure that the design was satisfactory.

Institution of Railway Signal Engineers

Insulation problems of concrete sleepers

A paper entitled, "The Electrical properties of concrete sleepers," was read by Mr. B. E. Morgan, of the British Railways Research Department, to the Institution of Railway Signal Engineers at a recent technical meeting.

The essential function of the sleeper, the author pointed out, was to spread the loads applied to the rails by traffic through the ballast and, in combination with the rail fastenings, to hold the track in good condition as regards line and top while maintaining gauge and with the minimum amount of maintainance. If a sleeper and its associated rail fastenings were to satisfy both the civil and the signal engineer, it must have a number of properties including strength, the use of fastenings that would not work loose but allow rails to be changed easily, must have sufficient rail-to-rail resistance for track circuiting purposes, and must be reasonably cheap.

The earliest practical designs of concrete sleepers were evolved in 1941, when British Standard 986, Concrete Railway Sleepers, was published. This provided for five classes of sleepers, but the one of most interest to main-line railways was the Class "E," designed for use in lines carrying the heaviest traffic in wartime conditions up to 180 trains a day with speeds up to 60 m.p.h. At this period, it was desired chiefly to design a sleeper strong enough to satisfy the civil engineer, and there was no mention of electrical resistance in the British Standard. These sleepers were about the same size as the wooden sleepers. The necessary strength was obtained by pre-stressing the sleepers with high tension steel wires of 0·2 in. dia. running the whole length of the sleeper.

The Class "E" sleeper was found not strong enough for the heavily worked lines, and with the high speeds and heavy locomotives visualised under the British Railways modernisation plan, a stronger sleeper became essential. This requirement was met by raising the compressive strength of the concrete, enlarging the section at the rail seat to 8 in. instead of the former 5 in., and increasing the number of wires.

As concrete sleepers were rigid, it was necessary, Mr. Morgan pointed out, to place a resilient pad between rail and sleeper. to absorb impact loads under traffic and prevent local high stresses. The best material that had been found was rubber. This provided the electrical insulation required between rail and sleeper. An alternative electrical path existed through the fastenings in contact with the rail foot. The paper described a number of track fastenings and insulations which had been found satisfactory and had a long life.

Mr. Morgan explained that the most convenient way of defining the suitability of track from the point of view of track circuits was to specify the minimum rail-to-rail resistance of a given length of track. This permitted measurement of resistance which was an easy operation and enabled different lengths to be compared. The Signal Engineering Committee specified a minimum rail-to-rail resistance of 2 ohms per 1,000 yd. of track.

Rail/Earth Resistance

The electrical engineer, however, was anxious, with the new 25,000-V. overhead electrified lines, that the resistance of any rail to earth should not be too high. It was agreed that the rail/earth resistance should never exceed 100 ohms per 1,000 yd. but should generally be lower. These two requirements set an upper and a lower limit to rail-to-rail resistance to be achieved by concrete sleepers.

Continuous Recording of Resistance

Because of wide variations in the rail-to-rail resistance of the track, whether of concrete or timber sleepers, caused by the effects of climate, it was realised that spot measurements taken periodically, could not be relied upon to give true records of the variations and could even be misleading. It was, therefore, decided to make a continuous record over a period of at least 12 months and to make simultaneous observations on adjacent wooden and concrete sleepers. Tracks and test lengths of approximately 400 yd. were

used, including about 500 sleepers. The recording equipment was based on a Wheatstone bridge circuit housed in a box alongside the track. Current was supplied from a battery and the recording voltmeter was driven by a 30-day clock. It was, therefore, necessary to visit each test site only at monthly intervals to change the charts, wind up the clock, and make a calibration. Several instruments of this kind had been in use up to three years with the minimum amount of trouble. Measurements on the concrete and wooden sleepered track were taken alternatively every 30 min. by means of a contact in the clock mechanism which effected the changeover automatically. The type of charts used and measurements recorded were illustrated in the paper.

The author concluded with the observation that the decision to use concrete sleepers was based on a thorough investigation of their mechanical and electrical properties. Inquiries might be made as to how the rubber insulation would stand up to weather conditions and whether the life of rubber components exposed to outside conditions would be long enough. This was a matter to be qualified by time, but after a three-year trial there was no evidence of the rubber rail pads failing in the track either mechanically or electrically. Great care had also been taken in the design of the rubber components used with the fastenings. It was, therefore, suggested that concrete sleepers, with suitable fastenings, might be used with confidence in track circuited lines.

Messrs. C. W. King, Chief Civil Engineer, British Transport Commission, opened the discussion and was followed by Messrs. E. G. Brentnall, A. Cardani, M. E. Leech, D. L. Mitchell, J. A. Riddle, J. F. H. Tyler, G. D. S. Alley, R. I. Douglas and M. G. N. Smith.

Scottish Region Passenger Services

Six additional multiple-unit diesel trains of British Railways, Scottish Region, between Edinburgh Waverley and Glasgow Queen Street now include buffet facilities, making a total of 18 refreshment services each way daily on this line.

On the West Highland section the refreshment car service in the 5.45 a.m. from Glasgow Queen Street to Fort William is extended to Mallaig, returning thence in the 1 p.m. train to Fort William and Glasgow.

The 4.45 p.m. from Oban to Glasgow (Buchanan Street), which on Mondays conveys the sleeping car for Euston, now leaves at 5.15 p.m., and reaches Glasgow at 9.30 instead of 9 p.m.

More Diesels on Stranraer Line

On the former Glasgow & South Western Railway the remaining steam workings between Girvan and Stranraer have now been turned over to diesel multiple-units, and the entire passenger service between Glasgow St. Enoch, Ayr, Girvan, and Stranraer is now diesel-operated.

E.M.I. Bid for Lancashire Dynamo Holdings Limited.—Electric & Musical Industries Limited has made an £11,600,000 share offer for Lancashire Dynamo Holdings Limited. Recently Metal Industries Limited made a £10,100,000 bid. The E.M.I. offer, which is unanimously supported by the Lancashire Dynamo board, is three 10s. shares for every £2 of Lancashire Dynamo ordinary stock, and 42 10s. ordinary shares for every £100 of Lancashire Dynamo preference stock.

Staff and Labour Matters

Claims for Shorter Working Week

Claims from the three railway trade unions for a shorter working week for railway salaried and conciliation staff have been received by the British Transport Commission.

The claim in respect of conciliation staff is for a 40-hr. week in 5 days of 8 hr. a day without any reduction in rates of pay and exclusive of Sunday.

In the case of salaried staff, the claim is that the standard weekly hours of duty, at present 42, should be reduced to a maximum of 38 worked in 5 days.

N.U.R. Wage Claim

Following the press conference given by the Chairman of the Commission on January 11, the General Secretary of the N.U.R. sent out a circular to all branches of the union, in which it was stressed that, having regard to the strong support by the public and the press for better pay for railwaymen, it is tremendously important that this goodwill should not be thrown away. Mr. Greene stated:—

"There will be no interminable delay before railwaymen get an increase arising from the pay review.

"It surely must be recognised by every thinking member that a 24-hr. strike by a section of the staff could achieve nothing more. On the contrary, it could well lose us the valuable support of the press and public opinion, and place the Executive Committee in a difficult situation in the forthcoming negotiations with the B.T.C.

"To achieve what we all want it is more than ever necessary that we should act as a united, disciplined body, and give solid backing to the Executive Committee.

"I therefore ask all members to reject emphatically all appeals for unofficial action which, particularly in view of the latest developments, could do railwaymen and the union no possible good, but probably very great harm."

In the leading article in *The Railway Review* published on January 15, it is stated that the Commission's statement has done little to ameliorate the deeply injured feelings of some of the best railwaymen on British Railways—the active trade union rank-and-file—who seem puzzled that at this stage the Commission is prepared to date any interim action from January 11 when it had only just refused the union's claim for a substantial increase in pay.

The Manchester District Council of the N.U.R. has decided against lending its support to a one-day token strike on February 1, urged by the London District Council in protest against delay in settling the pay demands.

The Manchester District Council adopted a resolution expressing concern about the wages issue and calling on the National Executive immediately to inform the British Transport Commission of the N.U.R.'s intention to insist on an early reply to the wage claim and a favourable conclusion to the pay review. Failing a satisfactory reply to this immediate representation, the Council demands that the National Executive Committee gives notice of its intention to call a national stoppage.

The Sheffield District Council of the N.U.R. has also decided not to join the token strike.

A special meeting of the Executive Council of the N.U.R. took place on January 19 at which the pay claim and the decision of the Manchester District Council was discussed.

Subsequently, Mr. Greene wrote to Sir Brian Robertson, Chairman of the Commission, asking for an early meeting to discuss an immediate interim award.

L.T.E. Pay Claim Rejected

Delegates representing 42,000 London busmen were informed by the London Transport Executive on January 18 that their request for a £1 increase in their basic weekly rates had been rejected and that the payment of a shift rate for those staffs, mainly drivers and conductors, not already getting a shift payment had also been refused. A statement issued by the L.T.E. after a 2½-hr. meeting said that the executive was unable "in present circumstances" to increase rates of pay.

The claim is not connected with the proposed bonus scheme for bus workers in Central London which has been under discussion for the past week, and on which talks are to be renewed today.

Southern Region Publicity

New poster issued by the Southern Region of British Railways to encourage road-rail traffic

Contracts and Tenders

Giesl ejectors and superheat elements for the Czechoslovak State Railways

The Czechoslovak State Railways has placed an order for 1,000 Giesl ejectors and superheat boosters after prolonged tests of the ejector in comparison with double Kylchaps and other forms of draughting. An agreement has been made between the Czechoslovak authorities and Schoeller Bleckmann Stahlwerke A.G. of Vienna, for these ejectors to be manufactured in Czechoslovakia under licence.

Fried. Krupp Maschinenfabriken of Essen, and Siemens-Schuckertwerke of Erlangen, have received an order for the U.S.S.R. Railways, comprising 20 single-phase 50-cycle 25 kV. electric locomotives of Co-Co axle arrangement, 138 tons weight, 62 m.p.h. top speed, and 4,750 kW. one-hour rating. They are to be of the silicon rectifier type.

Rheinstahl Siegener Eisenbahnbedarf has received from the Danish State Railways an order for 10 two-axle sliding side/fixed roof wagons of SEAG type.

Linke-Hofmann-Busch G.m.b.H. has received an order for 172 broad-gauge six-axle platform wagons for 60-ton loads from the North Western Railway of Pakistan.

The Malayan Railway Administration has placed contracts with Gammon Malaya Limited and the Danish firm of Christiani Nielsen of Copenhagen for major works on the North Klang Straits project to establish modern port facilities at Port Swettenham.

The Directorate of Overseas Surveys has commissioned two aerial photographic contracts in Nigeria and Sierra Leone involving an area of 18,000 sq. miles. The company awarded the contract is the Aircraft Operating Co. Ltd., of Johannesburg, the South African associate of the Hunting Survey Group. Work has already begun on the survey.

British Transport Docks has placed an order with Richard Dunston Limited for a twin-screw diesel-electric suction dredger for service at Port Talbot. The new vessel will supplement the existing dredging fleet and will help to provide and maintain an approach channel deeper than that at present available.

British Railways, North Eastern Region, has placed the following contracts :—

A. Tremble Limited : demolition work in connection with the abandonment of bays 4 and 5 at Greensfield Motive Power Depot, Gateshead

R. Costain Limited : conversion of part of the locomotive sheds to a repair shed at Greensfield Motive Power Depot

Etchells, Congdon & Muir Limited : one 1,500-lb. passenger lift at the new Traffic Manager's Offices, Newcastle

W. E. Hargrave Limited : installation of a hot-water system and associated works in the offices in the Old Station at York

H. Morfitt & Son Ltd.: installation of heating and hot-water system in offices at Leeds City Station

Westinghouse Brake & Signal Co. Ltd. : supply and installation of control console and associated equipment for the new power signalbox at Gateshead

Enfield Cables Limited: m.v. cables and switchgear for the East Coast main line re-signalling scheme at Tweedmouth

Westinghouse Brake & Signal Co. Ltd.: extension to the Newcastle signalling scheme

Edgar Allen & Co. Ltd.: one Tup testing machine for Dinsdale Welding Depot

Fleming Bros. Ltd. : steel-framed forwarding shed at Bradford Valley Goods Depot

Keighley Lifts Limited : one 1,200-lb. passenger lift at Holgate Villa Offices, York

F. H. Wheeler & Co. Ltd. : electric light and power installation at the new office block, Hull English Street

R. Costain Limited : part demolition and alterations to No. 3 signalbox, Newcastle Central Station

S. H. Heywood & Co. Ltd. : electric light and power installation at Bradford Hammerton Street Motive Power Depot

James Scott & Company : installation of electric lighting at Northallerton Low Gates Good Depot

Turnerised Roofing Company: treatment of Leeds Marsh Grain Warehouse roof by Turnerised process.

British Railways, Scottish Region, has placed the following contracts:—

R. H. Neal & Co. Ltd: three mobile cranes

Bone, Connell & Baxters Limited: supply of new steel superstructure, underbridge No. 152, Auchinleck

James Miller & Partners: reconstruction of overbridge No. 99, Hallhill Road, Shettleston

Kinnear, Moodie & Co. Ltd.: renewal of superstructure, overbridge No. 75, Blair Road, Blairhill

Underhill Heating Engineers Limited: low pressure hot water heating installation, Hyndland rolling stock maintenance depot.

British Railways Eastern Region, has placed the following contracts:—

Braithwaite & Co. Structural Ltd.: reconstruction of portion of superstructure of underline bridge No. 11 carrying the up main, down main and up neck lines over River Doe Lea between Staveley Town (closed) and Clowne & Barlborough

Ericsson Telephones Limited: supply and installation of complete train describer system between Hackney Downs, Seven Sisters, Enfield Town, and Chingford

Samuel Butler & Co. Ltd.: reconstruction of Swaithe overbridge No. 65 over main lines, between Wombwell West and Barnsley Courthouse

George E. Taylor & Co. (London) Ltd.: supply, delivery, and erection of electric lighting and power installation at Southbury, Turkey Street, and Theobalds Grove Stations

Pitchers Limited: provision of standby power house at Upminster, and alterations to existing signalbox and construction of new relay room at Upminster East

W. & C. French Limited: part demolition of bridge No. 207 and adjacent buildings, the construction of new abutments, wing walls and welded girder bridge, and the resiting of the down side parcels lift shaft on new foundations at Colchester Station.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From South Africa:

5 sets of h.t. lightning arresters

5 complete substation converter equipments

4 tiestation remote control equipments

3 substation remote control equipments

Spares, drawings, instruction books and spare parts catalogues.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. C.8129: Traction Substation Equipment," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is April 8, 1960. Local representation is essential. The Board of Trade reference is ESB/621/60.

From Portuguese East Africa:

Construction of the bridges over the Mulemadi, Mucadi, Mutuazi, Narre, and Nualo rivers, and their approaches to railway permanent works.

The issuing authority is the Public Works Department, Lourenço Marques. A provisional deposit of Esc.:290,946 must be made by tenderers. The tender No. is E.N.231. The closing date is March 8, 1960. Drawings and specifications are available at the Public Works Department, Lourenço Marques, for consultation by local agents of United Kingdom firms interested. The Board of Trade reference is ESB/741/60.

From Sudan :

4 shunting locomotives.

The issuing authority and address to which bids should be sent is the Sudan Gezira Board, Supplies Department, Barakat. Detailed specifications and conditions can be obtained from the Assistant General Manager (Supplies), the Sudan Gezira Board, Barakat. The closing date is February 1, 1960. The Board of Trade reference is ESB/584/60.

From India :

4 two-stage electric-driven stationary air compressors.

The issuing authority and address to which bids should be sent is the Director-General of Supplies & Disposals, Shahjahan Road, New Delhi. The tender No. is SE-7/15248-K/IV. The closing date is January 28, 1960. The Board of Trade reference is ESB/282/60.

Further details relating to the above tenders together with photo-copies of tender documents can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1.).

SMOKING ON LOWER DECKS OF BUSES.—The Minister of Transport, Mr. Ernest Marples, has upheld an appeal by the Northern General Transport Co. Ltd. and its associated companies, which run bus services in Tyneside and County Durham, against a decision by the Northern Area Traffic Commissioners to impose a ban on smoking on the lower decks of double-deck buses. The Minister has stated that he has allowed the appeal because it is unreasonable for Traffic Commissioners to seek to regulate the conduct of passengers in public service vehicles. The ban was sought by the Durham County Council and by the North East Federation of Trade Councils on the grounds of health. It was also argued that such a ban was practicable and had been imposed by municipal transport undertakings in the area. The company opposed the ban on the ground that the travelling public did not demand it.

Notes and News

Crewe Pupils and Apprentices Association Dinner.—The dinner of the Crewe Pupils and Apprentices Association will be held on Friday, April 29, at Whitehall Court, London, S.W.1.

Royal Engineers Army Emergency Reserve Annual Dinner.—The annual dinner of the officers of the Royal Engineers Army Emergency Reserve (Transportation) will be held on Friday, February 26, at the Café Royal, Regent Street, W.1, at 6.45 for 7.30 p.m.

Trade Mission to Argentina.—Members of a team representing leading British business organisations departed for Argentina on a trade mission last Wednesday. They travelled to Buenos Aires on behalf of a consortium of British manufacturers of construction equipment to complete negotiations for the sale of the equipment.

Collision Avoided by Locomotive Fireman.—A locomotive fireman, injured when his passenger train ran into a derailed goods train in darkness at Kettering, British Railways, London Midland Region, on January 15, saved an express and another goods train from colliding with the wreckage. After being thrown from his cab, the fireman ran along the track to warn oncoming trains.

Branch Line Society Tour of Scottish Closed Lines.—The Scottish Regional Group of the Branch Line Society has organised a "Central Scottish Railtrain," a tour by special train of closed branch lines in the Bo'ness, Bonnybridge, and Grangemouth area on May 7. The train will leave Polmont at 2 p.m. The fare will be about 17s. Details may be obtained from the Secretary of the Group, 35, Marlborough Avenue, Glasgow, W.1.

Prize-Winning Publicity.—Illustrated on this page are three prize-winning posters issued by the Southern Region of British Railways. The Canterbury poster won first prize at the Lisbon Trade Fair held last year, and the Hastings and Car Ferry posters both won second class awards in the National Outdoor Advertising contest held by the *World's Press News*, also last year. These posters represent the first entries ever made in any advertising competition by the Southern Region.

Rolls-Royce Limited, Railway Traction Department.—The Railway Traction Department of Rolls-Royce Limited has moved to Shrewsbury and the address is: Railway Traction Department, Rolls-Royce Limited, Shrewsbury, Salop. Tel.: Shrewsbury 52262.

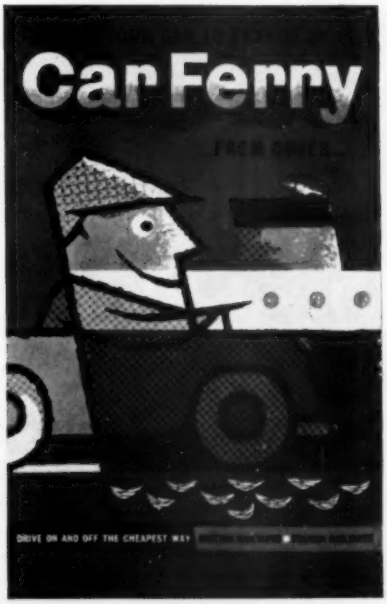
Level Crossing Accident in the United States.—A freight train collided with a school bus at a level crossing near Fackler, Alabama, on January 18. Four children were killed and eight seriously injured. The train was travelling at about 50 m.p.h. along a straight track and the weather was clear when the accident occurred. The driver of the bus, who was seriously injured, stated that he saw the train but could not avoid the collision because the brakes had failed.

Southern Region Train Alterations.—British Railways, Southern Region, down and up hourly expresses between Waterloo and Portsmouth Harbour now call at Havant with connections to and from Hayling Island, on weekdays; the same applies to the down Sunday service. The 4 p.m. on Sundays from Waterloo to Exeter calls additionally at Woking, and is provided with a restaurant car. Pullman car facilities are withdrawn from the 11 p.m. and 12 midnight trains from Victoria to Brighton, but the latter is provided with a buffet car; a Pullman car also is run in the 5 p.m. from Ore to Hastings, Eastbourne, and Victoria. On Sundays, until April 10, Bexhill West, Sidley and Crowhurst stations are closed, and the fast and slow diesel trains between Charing Cross, Tunbridge Wells, and Hastings do not stop at Crowhurst. To replace the local facilities given by the withdrawn through train between Ramsgate and Birkenhead, an express leaves Ramsgate daily at 8.55 a.m., calling at Deal, Dover Priory, Folkestone Central, and Ashford at 10.32 a.m., reaching Tonbridge at 11.3 a.m. It connects there with the 10.20 a.m. diesel train from Hastings, due in Charing Cross at 11.56 a.m. A corresponding return train starts from Tonbridge at 3.48 p.m. The buffet car service in the 11.10 a.m. from Charing Cross to Margate *via* Dover, and the return 3.25 p.m. from Margate, hitherto provided between Charing Cross and Folkestone only, is extended to and from Ramsgate.

Rebuilt Platform at Queen Street Low Level Station, Glasgow.—The new No. 10 platform was brought into use at Queen Street Low Level Station, Glasgow, British Railways, Scottish Region, last Monday, marking a further stage in the modernisation of the station in preparation for the introduction this year of electric trains. This new platform, for westbound trains to Helensburgh, Balloch, Milngavie, Hyndland, and so on, replaces the old No. 10 platform and no change in travelling arrangements is involved.

Monte Carlo Rally Competitors Conveyed by B.R. Steamer.—Eighty British competitors in the Monte Carlo Rally travelled with their cars from Dover to Boulogne on January 19 by British Railways, Southern Region, car ferry *Maid of Kent*, which made a special journey planned to fit in with the drivers' schedules. The vessel was described briefly in our June 5, 1959, issue. Since entering service last May, the *Maid of Kent* has made nearly 600 crossings and carried about 57,000 cars, 1,000 caravans, 700 motorcoaches, 2,600 motor-cycles, and 200,000 passengers.

Scottish Region Stations Competition for Main-Line Termini.—Winners of British Railways, Scottish Region, Best-kept Stations competition for main-line stations for 1959 were Perth in Group "A" and Paisley Gilmour Street in Group "B." Group "A" competitors include Aberdeen, Edinburgh Waverley, Edinburgh Princes Street, Glasgow Central, Glasgow St. Enoch and Perth. Group "B" covers Dundee Tay Bridge, Glasgow Buchanan Street, Glasgow Queen Street, Inverness, and Paisley Gilmour Street. On January 13, 1960, at the headquarters office of the Scottish Region in Glasgow, Mr. C. J. H. Selfe, Assistant Commercial Manager, handed a cheque for £50 to Mr. R. M. Shand, Stationmaster, Perth, the winners in Group "A" and a



Prize-winning posters issued by the Southern Region of British Railways (news paragraph on this page refers)

cheque for £25 to Mr. E. Steele, Stationmaster at Paisley Gilmour Street, winners in Group "B." Mr. H. M. Lattimer, Assistant Operating Superintendent, who presided, indicated that the competition was on a points system and that all aspects were taken into account in reaching a total figure.

Lines Blocked by Snow in Scotland.—Several lines of British Railways, Scottish Region, were blocked after a blizzard earlier this week. Thirty-five passengers were stranded in a train at Newmachar, Aberdeenshire, and were rescued with the help of helicopters. Four other trains were halted by drifts on the Perth-Aberdeen main line.

Sulzer Engine Production.—The 1959 diesel engine output by Sulzer Bros. Ltd. and associated companies throughout the world, excluding all licensees, was 107 units totalling 215,860 b.h.p. These consisted of 15 big marine engines, Type "SD" and "RD," totalling 98,500 b.h.p.; 20 medium-size marine and stationary engines, Type "T," 48,730 b.h.p.; and 72 auxiliary marine, stationary, and rail-traction engines, 68,630 b.h.p.

Crown Prince of Nepal Visits Vulcan Foundry.—The Crown Prince of Nepal, Prince Birenda Bir Bikram Shah, accompanied by the Nepalese Ambassador, Mr. R. P. Manandhar, and the British Ambassador to Nepal, Mr. L. P. Scopes, recently visited the plant at Newton-le-Willows, Lancs., of the Vulcan Foundry Limited, a subsidiary of the English Electric Co. Ltd. They were accompanied by Mr. Gerald Collingwood, Managing Director of the Vulcan Foundry Limited.

College of Technologists.—A College of Technologists has been set up under the auspices of the National Council for Technological Awards. It will administer and confer a new award, M.C.T. (Member of the College of Technologists) which is the technological equivalent of a University Ph.D. and a development of the Dip.Tech (Diploma in Technology). The M.C.T. award will be given to those who complete a substantial programme of work of value to industry, carried on jointly in industry and a college.

Richard Thomas & Baldwins Limited, Results.—Group manufacturing and trading profits by Richard Thomas & Baldwins Limited increased by £2,150,552 to £10,181,220 in the year ended October 3, 1959. With the inclusion of investment income and after providing for depreciation and tax, the net profit of £4,122,085 compares with £3,014,037. A final dividend of 9 per cent again makes the annual total 13½ per cent. Two contracts worth £2,000,000 each for the Spencer steelworks near Newport were placed last week. The main British firm involved is James Howden & Co. Ltd.

Southern Region Continental Publicity.—Two new first-time pieces of continental publicity have been produced by the Southern Region. These are a 28-page booklet in full colour covering the whole of the Continent, and a full-colour version of the Car Ferry brochure. Both productions are profusely illustrated on art paper. The Continental booklet contains light-hearted references to eleven countries and touches on Scandinavia. Each reference is illustrated by coloured sketches and tinted half-tones and includes details of return fares from London to main tourist centres in the countries concerned. The booklet also contains brief pointers to train services from Britain to the Continent and a double-spread main-line railway map covering the British Isles and the Continent. The car-ferry brochure contains full details of the Region's three car-ferry services over the whole of 1960, brief information on reservations, facilities for motor-cycles, bicycles, and caravans, car-sleeper services, and rates and fares. A series of nine half-tone blocks shows the procedure followed by a user of the car-ferry service and illustrates the catering facilities offered by bar, restaurant, and lounge. An application form for reservation of space for accompanied motor vehicles is enclosed in the brochure.

Hawker Siddeley Group Results.—The total profit, after taxation, attributable to the Hawker Siddeley Group for the year to July 31, 1959, rose by £1,000,000 to £6,250,957. A final dividend of 7 per cent, less tax, is recommended making a total of 10 per cent less tax. The turnover was about £260,000,000. The Brush Electrical Engineering Co. Ltd. obtained a contract from the British Transport Commission for the supply of 60 Type "2" diesel-electric locomotives and 44 similar units were delivered. Also a repeat order has been received for 100 locomotives for delivery this year.

Christmas Traffic at Paddington.—Proof that many people follow the same pattern in travelling to family re-unions and for holidays at Christmas time is given by British Railways, Western Region, in an analysis of Christmas traffic from Paddington Station. During the four days preceding Christmas, 1959, 91,700 passengers were carried from Paddington in 332 long-distance expresses, compared with 84,549 a year previously in 279 similar trains; the 1958 figure was reduced slightly because the four days under review included a Sunday. The volume of Christmas parcels post traffic from Paddington was extremely high, the total of 193,916 bags being only 807 bags below the 1958 record loadings.

Passengers Refuse to Leave Central Line Train, L.T.E.—Passengers travelling on the Central Line, London Transport Executive, refused to leave a train which was turned round at Leyton on January 18. The trouble arose when a train broke down between Mile End and Bethnal Green. Trains could go no further than Leytonstone or Liverpool Street on either side of the obstruction, until the defective train was pushed into Bethnal Green by a following train. Passengers on the first train to arrive from eastern stations during the hold-up got out when asked to do so, but people in the last two coaches of the next train refused to get out. The train was reversed and the passengers were taken back the way they had come.

Liège International Fair.—To avoid synchronising with other European fairs held in April and May, the twelfth Liège International Fair will be held on June 2-16. The principal sections continue to be Mechanical and Electrical Engineering, Metals and Mining Equipment, with exhibits in 22 industrial groups. Among these are Sheeting (Group 6), including boiler work and packing materials; Bridges & Boilers (Group 8), including bridge-building materials and boilers and tubes; Railway & Transport Equipment (Group 10), including locomotives and rolling stock, containers, brakes, signal equipment, and permanent way material; Compressors, Engines, Generators & Pumps (Group 12), including diesel and petrol engines; Tooling & Machine Tools (Group 13); Mechanical Handling & Welding (Group 15); Machinery & Heavy Engineering (Group 16), including electric welding, boiler making, blast furnaces, rolling mills, wire drawing, forges, electrometallurgy, water and gas purification, industrial burners, greasing, ventilation, air-conditioning, dust removal, and drying; Industrial Electricity & Electronics (Group 17), including electric vehicles, and electrically operated track points; and Precision Engineering (Group 18). Details may be obtained from the United Kingdom representative, Mr. R. C. Liebman, 178, Fleet Street, E.C.4, tel.: City 5889.

United Steel Companies Limited, Public Relations Department.—The public relations department of United Steel Companies Limited will move to a new office on January 25. The address will be: (G.P.O. Box 64), The Mount, Broomhill, Sheffield, 10, tel.: Sheffield 60081.

Increase in Air Traffic.—United Kingdom air lines increased their traffic by 19 per cent in 1959, according to the Ministry of Aviation. It is estimated that total load short ton-miles performed on scheduled and inclusive tour services were 404,000,000 compared with 341,000,000 in 1958. The overall load factor, i.e. the percentage of available capacity filled, increased from 59 per cent to 61½ per cent.

A. Reyrolle & Co. Ltd., and C. A. Parsons & Co. Ltd., Merger.—Plans are being drawn up for a merger of A. Reyrolle & Co. Ltd. and C. A. Parsons & Co. Ltd. If it goes through, it will create a group with total assets of some £55,000,000 and net current assets of some £27,000,000. Under the scheme proposed, a holding company would be set up to take over the share capitals of both companies, but they would continue to trade as separate entities with their own managements and with their present works.

Western Region Train Alterations.—Second class sleeping cars of the improved type, with two-berth compartments, full bedding, and washing facilities, are now running in the 10.30 p.m. and 12.30 a.m. from Paddington to Penzance, the 11.50 p.m. from Paddington to Plymouth, and the 8.45 and 9.30 p.m. from Penzance and 1 a.m. from Plymouth to Paddington. The 10 p.m. "sleeping-car only" train from Milford Haven to Paddington no longer runs on Saturday nights, but runs on Sunday nights instead, when ordinary first and second class accommodation is included, and additional stops are made at Cardiff and Newport. The 6.23 p.m. express from Paddington to Birmingham and Wolverhampton calls additionally at Knowle & Dorridge at 8.44 p.m. to set down Birmingham suburban passengers.

Road Hauliers to Press for Better Roads.—Speaking at the recent annual dinner of the South London Sub-Area of the Road Haulage Association, Mr. A. E. Drain, Chairman of the Metropolitan & South East Area of the Association, referred to "a campaign that is now commencing for trying to force traffic to the railways." There was no doubt in the minds of the great number of industrial concerns, he stated, as to the most suitable way of moving their commodities; road transport came out with flying colours. It attracted a great volume of traffic without adding to road congestion, as had sometimes been alleged. Over the past 10 years the number of vehicles operated by hauliers had risen only a little, but the traffic they carried increased rapidly all the time, so that the road hauliers were helping to relieve congestion. The railways, he went on, were receiving very large sums of money from the Government to modernise their equipment and to cover their increasing deficit. The R.H.A. must watch to ensure that the money, which came out of the taxpayers' pockets, was not used by the railways in any way that could result in driving the hauliers out of business. He would like to think after the General Election that the transport industry

might be taken from the political arena for ever. The lack of road improvements cost Britain many millions of pounds annually. If the money which the road haulage industry supplied to the Exchequer from the road fund tax and fuel tax were used for building and improving roads, this situation would be reversed. The Association must try to influence the present Government to use the money from road users for road improvements.

Central Wagon Co. Ltd., Results.—With an unchanged final payment of 10 per cent, the dividend of the Central Wagon Co. Ltd. is 15 per cent. A 10 per cent tax-free capital distribution was paid in May of last year. Group profits for the year ended September 30, 1959, were higher at £177,028 against £155,232 for 1957-58, after tax of £162,070 (£167,264) and depreciation of £43,297 (£38,953).

Railway Benevolent Institution.—At a meeting on January 18 the board of the Railway Benevolent Institution granted annuities to nine widows, three members, and one child involving an additional liability of £302 per annum. One hundred gratuities were also granted amounting to £1,034, to meet cases of immediate necessity. Grants made from the Casualty Fund during December amounted to £1,570.

Westinghouse Brake & Signal Co. Ltd., Results.—The peak group trading profit of £2,557,488 by the Westinghouse Brake & Signal Co. Ltd. for 1958-59 compares with £2,035,101 the previous year. An increase of 1 per cent to 11 per cent in the dividend is recommended. The trading profit figure is struck after charging for depreciation of £808,935 (£669,608). Group net profits also were a record at £1,286,795 against £879,235.

Landis Machine-Maiden Limited Selling Agency.—Alfred Herbert Limited has been appointed sole selling agents in the United Kingdom for machinery manufactured by Landis Machine-Maiden Limited, and fitted with Landis Tangential threading equipment. The agreement does not include the range of type "A" and "ST" radial die-head machines, and the bar chamfering and tagging machines which continue to be distributed through the trade.

Ideal Home Exhibition Advertised on British Transport Sites.—The most extensive campaign, for the Daily Mail Ideal Home Exhibition, to take place on British Transport Advertising sites will be launched on February 15. The Exhibition, which opens on March 1, at Olympia, London, W., will be featured for four weeks on the sides and fronts of London Transport buses, and on L.T.E. Underground and British Railways double-crown poster sites; 16-sheet positions on British Railways stations will also be used. British Transport Advertising received the order from S. H. Benson Limited.

Glyn, Mills & Company in 1959.—The profit of Glyn Mills & Company for the year ended December 31, 1959, was £245,675, after providing for taxation and transfer to reserve for contingencies. With the balance brought forward this made £399,484, compared with £328,009 for the preceding year. An interim dividend of 9 per cent, less tax (as in 1958), was paid on July 31, 1959, which with transfers to the reserve fund and reserve for contingencies makes £183,334. From this the board proposes to pay a final dividend of 9 per cent less tax, also as in the preceding year. The balance carried forward is £117,184 (£153,809). At an extraordinary general meeting on December 21 last, the issued capital of the company was increased from £1,200,000 to £1,500,000 by the capitalisation of reserves.

Mansfield Motive Power Depot to Close.—The locomotive motive power depot at Mansfield, British Railways, London Midland Region, is to be closed in April to effect economies. Most of the staff will be transferred to Kirkby-in-Ashfield Depot.

Road Casualties in November, 1959.—About 20 people, on an average, were killed on the roads of Great Britain every day in November last. The total of 625 for the month was 88 more than in November, 1958. The seriously injured numbered 6,981, an increase of 1,063. The total for all casualties, 28,064, was over 12 per cent more than in November of the preceding year. Motor traffic on the main roads is estimated to have been 11 per cent more than in 1958.

Improvements in British Railways Steel, Merchandise, and Passenger Traffics.—During the seven weeks ended December 18, 1959, the amount of steel carried by British Railways from principal steelworks totalled 1,433,000 tons, an increase of 285,000 tons, or nearly 25 per cent, compared with the corresponding period of 1958. Merchandise tonnage carried during the three months ended November 29, 1959, totalled 9,512,000, an increase of 833,000 tons, or 9·6 per cent, compared with the corresponding period of 1958. For the last four weeks of 1959 last year, British Railways passenger receipts showed an increase of £840,000, to £10,533,000 against the comparable weeks a year previously. Only part of this improvement was the result of the increase in passenger fares in November.

Record Christmas Mail Carried by British Railways.—A record number of parcels and letters were carried by British Railways last Christmas. Special railway depots set up to handle Christmas parcels post at large centres dealt with 1,125,447 mailbags compared with 1,023,765 the previous Christmas, an increase of about ten per cent. Receipts from parcels, letters, and general merchandise carried by passenger train during the week ended December 27, amounted to £879,000, or £133,000 more than in the corresponding period of 1958. The aggregate revenue from this traffic in the 52 weeks ended December 27, 1959, was £54,038,000, an increase of £1,257,000 over the 1958 total for the same period. The improved receipts are a direct reflection of the increased volume of traffic, as rates remained unaltered throughout 1958 and 1959.

Mechanical Handling Exhibition, 1960.—Many new exhibitors will display their products at the Mechanical Handling Exhibition to be held this year at Earls Court, London, S.W., on May 3-13. Inquiries from prospective visitors from many parts of the world, indicate that buyers from over 80 countries will visit the exhibition. Some of the mechanical handling installations are too big to bring into Earls Court, and for this reason, a special show of films is being planned. These will be shown in a film theatre at the exhibition and will cover applications of various types of equipment in many industries. The programme will be divided into two sections, showing general films on mechanical handling and exhibitors' own films depicting their equipment in use. The Exhibition is organised by the Iliffe journal *Mechanical Handling*. It will be open from 10 a.m. to 6 p.m. daily, except Sunday, May 8. Further information, a programme of film sessions, details of travel and hotel facilities, and free admission tickets can be obtained from the Organiser, Dorset House, Stamford Street, S.E.1.

Metalock (Britain) Limited Birmingham Office.—Because of the growing demand for its services in the Birmingham area, and in pursuance of its policy of decentralisation, Metalock (Britain) Limited, has opened a Birmingham office at Windsor Chambers, Bearwood Road, Smethwick, Birmingham, 41, tel. Bearwood 2799. The manager is Mr. A. K. Hughes.

Diesel Train in Collision with Lorry.—A two-car diesel train crashed into a lorry at a level crossing near Mildenhall, British Railways, Eastern Region, on January 15. Two men were killed and a third injured. The train, the 7.34 a.m. from Mildenhall to Cambridge, collided with the lorry at Lee Farm Crossing, a private right of way over the single track between Mildenhall and Isleham.

New Shell-Mex & B.P. Films.—Two new 35-mm. films have been produced by Shell-Mex & B.P. Ltd. "An Industrial Notebook on the Generation and Distribution of Electricity" runs for 25 min., and shows problems of transporting and building large equipment; use of diesel generators; production of aluminium cable; and electrical breakdown testing. "Liquefied Petroleum Gases in Industry" runs for 25 min. 47 sec., and covers applications and reasons for use of liquefied petroleum gases (termed L.P.G.); storage, and distribution. Processes shown include the manufacture of rivets, glass, and automatic gearboxes.

Wolf Electric Tools Limited Industrial Film.—A 16-mm. colour film, "One Jump Ahead," by Wolf Electric Tools Limited, which had its premiere last week in London, is intended to show the potentialities of universal electric tools for heavy production and special work. It was made in collaboration with Modern Engineering (Bristol) Limited, Millars Machinery Co. Ltd., the Willenhall Radiator Co. Ltd., and John Lang & Sons Ltd., in the factories of which most of the action sequences were taken under normal working conditions. The film was designed with the needs in mind of training organisations, technical colleges and education authorities, to which it will be supplied on loan free of charge. In due course copies will be available through industrial film libraries and also to all English-speaking countries.

Exhibition of Instruments for Temperature Measurement and Control.—Negretti & Zambra Limited held an exhibition of instruments for temperature measurement and control at the Royal Society of Arts, London, on January 20 and 21. A new range of electrical temperature-measuring and controlling instruments, known as the Aetec series, was shown. This covers a wider range of temperatures, beyond that of instruments of the mercury-in-steel type, as well as providing the advantages of multi-point measurement in a single instrument. The range combines all the desirable features of previous models with additional advantages. Also presented was a wide range of automatic temperature controllers to fulfil practically every requirement, operating on various principles, and with forms of control to suit particular plant conditions and covering different temperature ranges.

Dorman Long & Co. Ltd. Shares Distribution.—The Directors of Dorman, Long & Co. Ltd. propose to recommend for the approval of the shareholders that £7,500,000 of reserves be applied in paying up 7,500,000 new ordinary shares of £1 each to be allotted to the ordinary shareholders on the basis of one new ordinary share for every two existing ordinary shares registered in their names on January 11, 1960. The necessary resolutions will be proposed at an

extraordinary general meeting to be held immediately upon the conclusion of the annual general meeting on February 3, 1960. The proposed 7,500,000 new ordinary shares will not rank for the final dividend for the year to September 30, 1959, but will in all other respects rank *pari passu* with the existing ordinary shares. Profits have shown some improvement since the end of the financial year and if this continues it should be possible to distribute in respect of the current financial year a total of 10 per cent on the increased ordinary share capital.

Forthcoming Meetings

January 23 (*Sat.*).—Railway Enthusiast's Club, at 273, Farnborough Road, Farnborough, Hants, at 7 p.m. Paper on "The rectifier electric locomotive—its supply, control and merit," by Mr. D. B. McKenzie.

January 25 (*Mon.*). — Electric Railway Society, Birmingham Section, at the Exchange & Engineering Centre, Birmingham, at 7.15 p.m. Films : "Swiss and Continental light and electric railways," by Mr. J. Adams.

January 26 (*Tue.*).—Institution of Railway Signal Engineers, Bristol Section, at Chippenham, at 6 p.m. Paper on "Lifting barriers at level crossings in accordance with the requirements of Ministry of Transport & Civil Aviation," by Mr. S. D. Concha, British Railways, North Eastern Region.

January 27 (*Wed.*).—Southern Region, British Railways, Lecture & Debating Society, at the Chapter House, St. Thomas's Street, S.E.1, at 6 p.m. Paper on "The material for the job," illustrated by Mr. R. L. P. Cobb, Supplies & Contracts Manager.

January 27 (*Wed.*).—Peterborough Railway Discussion Group, at Peterborough Technical College, Eastfield Road, at 6.45 p.m. Paper on "Motive power modernisation," by Mr. C. H. Scutt, Motive Power Officer, Great Eastern, L.T.M.O., Liverpool Street.

January 28 (*Thu.*).—Permanent Way Institution, Nottingham & Derby Section, in the Midland Hotel, Derby, at 7 p.m. Paper on "Mechanical reballasting," by Mr. P. F. James, District Engineer's Office, Derby North.

January 29 (*Fri.*).—Permanent Way Institution, Hull Section, in the District Engineer's Shops Mess Room, Anlaby Road, Hull, at 7 p.m. Lecture with slides by Mr. William Morris, City Engineer, entitled "Municipal engineering."

January 30 (*Sat.*).—Permanent Way Institution all Sections in London. Council meeting (morning), annual winter meeting (afternoon), Conversazione (evening).

January 30 (*Sat.*).—Railway Enthusiast's Club, at 273, Farnborough Road, Farnborough, Hants, at 7 p.m. Paper on "Traffic operation—can it be work studied ?" by Mr. F. Aldred, Work Study Assistant to the Regional Establishment & Staff Officer, Eastern Region, British Railways.

January 30 (*Sat.*).—Electric Railway Society, Southampton Branch, at the University, Southampton, at 6.30 p.m. Swiss railway review, by Mr. B. J. Prigmore.

January 30 (*Sat.*)—Railway Students' Association. Visit to B. T. C. Research Laboratories at Derby.

February 1 (*Mon.*)—Institute of Traffic Administration, Kent & South East Centre, at the Wig & Gown Hotel, Maidstone, at 7.30 p.m. Paper on "Fire and transport," by Lt.-Commander J. Fordham, chief officer, Kent Fire Brigade.

February 1 (*Mon.*)—Institute of Transport, Metropolitan Section, at 80 Portland Place, London, W.1, at 6 p.m. Paper on "The changing scene in transport since 1947," by Sir John Benstead.

February 1 (*Mon.*).—Railway Correspondence & Travel Society, Northampton Branch, at the Liberal Club, Castilian Street, Northampton, at 7.30 p.m. Paper on "Wolverton past and present," by Mr. R. Frisby.

February 1 (*Mon.*).—The Society of Engineers, in the apartments of the Geological Society, Burlington House, London, W.1, at 5.30 p.m. Presidential address by Mr. E. G. Massy Collier.

February 2 (*Tue.*).—Institute of Transport, at the Connaught Rooms, Great Queen Street, W.C.2, at 12.15 for 1 p.m. Informal luncheon.

February 2 (*Tue.*).—Railway Correspondence & Travel Society, Lancs., North West Section, at Preston Station, at 7.15 p.m. Paper on "British Railways modernisation," by Mr. B. R. Preston, Assistant Operating Superintendent.

February 3 (*Wed.*).—Peterborough Railway Discussion Group, at Peterborough Technical College, Eastfield Road, at 6.45 p.m. Paper on "Preserving railway relics," by Mr. J. H. Scholes, Curator of Historical Relics, British Transport Commission, Clapham.

February 4 (*Thu.*).—British Railways, Western Region, London Lecture & Debating Society, in the Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m. Paper on "Modernisation progress and developments in the Civil Engineering Department," illustrated, by Mr. M. G. R. Smith, Chief Civil Engineer, Western Region, British Railways.

February 5 (*Fri.*).—The Railway Club, at the Royal Scottish Corporation, Fetter Lane, E.C.4, at 7 p.m. Annual general meeting (members only) followed by a display of members' colour transparencies on railway subjects.

February 5 (*Fri.*).—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, N.W.1, at 7.15 p.m. Film show "Some highlights of post-war years," by Mr. W. A. Camwell.

OFFICIAL NOTICES

BRITISH TRANSPORT COMMISSION

BRITISH Transport Commission invites applications for the following post: Research Station, Docks & Waterways, Hayes Road, Southall. Scientific Officer—Salary range £1,045-£1,150.

Candidates should have good degree in Physics or Engineering with mathematical ability and knowledge of hydraulics. Practical experience in research or engineering an advantage.

Superannuation scheme. Certain travel facilities. Medical examination. Write stating age, qualifications and experience to Director of Establishment, British Transport Commission, 222, Marylebone Road, London, N.W.1, within seven days.

JIG AND TOOL DESIGNER wanted for medium engineering firm engaged on production of machined castings for wide range of products. Position would suit young man 26/30 with some experience seeking wider prospects including planning. Good pay, 5 day week, club and canteen facilities. Apply with details to Lightalloys Ltd., St. Leonards Road, Willesden, N.W.10.

Railway Stock Market

Caution again has been the keynote in stock markets, where higher bank rate possibilities made for a waiting attitude, and suggestions that the rise in markets might have gone far enough for the time being led to moderate profit-taking. The lower prices later tended to bring in buyers, but demand was much more selective recently than in the preceding weeks.

Among railway stocks, Canadian Pacifics have eased from $48\frac{3}{4}$ to $47\frac{3}{8}$. The 4 per cent preference strengthened slightly to 57 and the 4 per cent debentures remained at $66\frac{3}{8}$. Elsewhere, White Pass shares were maintained at $13\frac{3}{4}$.

Antofagasta ordinary stock eased from $16\frac{1}{2}$ a week ago to 16, and the preference stock was also fractionally lower at 29½xd. The 5 per cent (Bolivia) debentures changed hands at par. Costa Rica ordinary stock remained at $22\frac{1}{4}$, with the $6\frac{1}{2}$ per cent first mortgage debentures at $80\frac{1}{2}$. Chilean Northern first debentures were 60, and Brazil Railway bonds quoted at 8.

Elsewhere, International of Central America have been marked up from $22\frac{1}{2}$ to $25\frac{1}{2}$, though the preferred came back from $114\frac{1}{2}$ to $112\frac{1}{2}$. Mexican Central "A" bearer debentures gained a point at $56\frac{1}{2}$. United of Havana second income stock was again 6 with business at $\frac{3}{4}$ marked in the consolidated stock.

Paraguay Central prior debentures again were quoted at $16\frac{1}{2}$ and Guayaquil & Quito assented bonds at $80\frac{1}{2}$.

West of India Portuguese guaranteed stock was $109\frac{1}{2}$, with the 5 per cent debentures $91\frac{1}{2}$. Gedaref Railway & Development 5 per cent guaranteed debentures were quoted at $93\frac{1}{2}$.

In other directions, Nyasaland Railways shares were 10s. and the $3\frac{1}{2}$ per cent first debentures $51\frac{1}{2}$.

Shares of engineering and kindred companies have been affected by the set-back in stock markets. North British Locomotive, for instance, lost part of their recent rise, being 11s. 9d. compared with 12s. 6d. a week ago. Beyer Peacock 5s. shares, however, held their improvement to 9s.

G. D. Peters were again 20s. 7½d. but it seemed doubtful if the quotation was adequately tested, the shares remaining firmly held. Birmingham Wagon kept at 29s. and Wagon Repairs 5s. shares were little changed on balance at 11s. 10½d.xd. Gloucester Wagon 10s. shares remained at 15s. 3d., Charles Roberts 5s. shares were firmed at 19s. 4½d. though elsewhere Westinghouse Brake reacted from 58s. 6d. to 57s. 6d.

Associated Electrical strengthened from 65s. 3d. a week ago to 66s. English Electric eased from 49s. 7½d. to 48s. 3d. and General Electric from 45s. 3d. to 44s. 9d. Crompton Parkinson 5s. shares were 14s. 6d. "ex" the scrip issue and B.I. Cables rallied to 59s. 6d.

Metal Industries were 74s. after the news that Electric & Musical Industries had put in a larger take-over bid for Lancashire Dynamo than the offer made by Metal Industries. News has been awaited whether Metal Industries will increase its bid. Lancashire Dynamo shares were 78s. 9d. Machine tool shares were unaffected by talk of more mergers in the industry. Asquith 5s. shares were 18s. 6d. and Alfred Herbert 56s. In other directions, Broom & Wade were 32s. 3d. and Holman Bros. 10s. shares 24s. 3d.

Stone-Platt rose afresh from 62s. 3d. to 63s., and the 10s. shares of Dowty Group gained a few pence at 51s. 9d. Pollard Bearing 4s. shares were 40s. 9d. and Ransomes & Marles 5s. shares 25s. 3d. Pressed Steel 5s. shares were active at 42s. 9d.

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